Utah Civil
SA 1B 50/5/4

Digitized by the Internet Archive
in 2019 with funding from
Wellcome Library

https://archive.org/details/s6867id1324601

# TRANSACTIONS

OF THE

# British Society for the Study of Orthodontics.

January - December 1911

~~MAY—DECEMBER,~~ 1911.

**London :**

PRINTED FOR THE SOCIETY BY
THE DENTAL MANUFACTURING COMPANY, LIMITED.,
ALSTON HOUSE, NEWMAN STREET, W.

# ORDINARY MEETING.

An ordinary meeting was held at the Medical Society's Rooms, 11, Chandos Street, Cavendish Square, W., on 11th January, 1911.

Mr. Wm. Rushton, the President, was in the chair.

The minutes of the previous meeting were read and confirmed.

Mr. Louis Jeffrey was formally admitted to membership of the Society.

Mr. Ashley Densham, L.R.C.P., M.R.C.S., L.D.S., was balloted for and elected a member.

## Casual Communication.

Mr. G. Paton Pollitt showed slides of a case of post-normal occlusion in a girl, aged 16, which had been treated by fixed appliances in the ordinary way, after expansion of the arches by means of expansion plates. The use of these plates in this case Mr. Pollitt now thought had not been necessary, as the requisite amount of expansion could have been done during the treatment by the fixed appliances. and much time could thereby have been saved. The interesting point in the case was that on the left side no retention had been used to keep the premolars and molars in proper occlusion, beyond the wearing of the bands and arches for about a couple of months after the teeth were moved, and by the interdigitation of the well-pronounced cusps the right occlusion had been maintained. This was interesting, as the girl was over eighteen when the case was finished, and the jaws and teeth were strong and well developed. On the right side the occlusion was not quite so good and there was a tendency on the part of the teeth to resume their wrong positions, so a retention was placed on the right lower first pre-molar. This retention consisted of an iridio-platinum band fitted carefully to the tooth and burnished over the anterior part of the crown of the tooth. The iridio-platinum used was about $\frac{4}{1000}$ inch thick. After fitting, it was placed on the tooth and a piece of inlay wax placed on it and the patient directed to bite home. The wax was then trimmed up, so that a sort of spur or plane of wax went up between the upper first pre-molar and canine when the mouth was

Device to retain lower in place. A.—Raised Gold Cusp.

closed. This was reproduced in gold by casting, and the piece cemented on to the tooth ; in other words, this had the effect of elongating the cusp of the lower premolar, and so acting as a retention and also by having the gold a little " high " the upper premolar was bitten back a little.

Mr. Carl Schelling said he did not quite follow Mr. Pollitt's opinion that expansion in this case was a mistake ; he personally thought it was good treatment.

Mr. Pollitt replied that the ordinary expansion plate did not expand very much, as a rule, in the incisor region.

Mr. H. Baldwin said that obviously the right thing was to expand, using a form of spring plate, which expands most in the bicuspid and canine region. Unless the canines were somewhat expanded one could not get the front teeth back sufficiently. The difficulty always was to

expand the canines, especially the upper ones, and after doing this one could get the upper incisors into good position.

Mr. POLLITT said he meant to suggest that in the premolar region in this case expansion was not necessary.

Mr. SCHELLING made a sketch of a spring expansion plate designed to act only on the anterior teeth.

Dr. SIM WALLACE made a communication as to the growth of children's arches and suggested the importance of taking models, beginning at the earliest time possible in order to study developments and changes at different ages. His remarks were illustrated by the presence of his son, the development of whose arches was examined with much interest by the members.

Mr. NORTHCROFT asked if Dr. Wallace had formulated any definite theory as to what took place in the growth of the normal jaw.

Dr. WALLACE replied that he had formed a definite idea, but had not brought it forward as time was limited.

The CHAIRMAN suggested that this might be left for another communication.

The CHAIRMAN then delivered his

## Inaugural Address.

Gentlemen,—My first duty to-night is to thank you very sincerely for the honour you have conferred upon me by electing me as your president for the coming year. I cannot pretend that my knowledge of the science and art of orthodontics can compare with that of my predecessors in the office. My time has been too much engaged in other directions to allow me to devote a large portion of it to this fascinating study, but it is one in which I take a very keen interest.

I joined the Society at its foundation, hoping to learn something and feeling I had but little to impart to others. Since joining the Society I have not only learnt much, but have greatly enjoyed our meetings and have come into closer contact with those who take a special interest in Orthodontics.

That we shall have an interesting session is my earnest desire. I know I have the good wishes of my fellow-members—fellow-students, shall I say ?—and I know I can count on the advice and co-operation of our Council to assist me in what I cannot but regard as a responsible though honourable position.

Our branch of science is becoming a most important one and is rapidly evolving from the empirical to the scientific stage. When I was a student it was considered that if one produced an even row of upper front teeth one had fulfilled all that was necessary. The question as to whether he had left the teeth in a state of stable equilibrium did not enter into our reckoning, and the resulting articulation was a very secondary consideration. I often wonder what the present condition is of the teeth I regulated as a student. Some are probably in the same condition as that of some of the patients we occasionally see who tell us that they "wore a plate for years, but it did not seem to do any good."

An important epoch in the study of the science was inaugurated when Dr. Edward H. Angle, of Philadelphia, by his writings opened our eyes to the possibilities of treatment and emphasized the fact that no permanently satisfactory results could be obtained which did not leave the teeth in a state of stable equilibrium based on correct occlusion. His classification, too, was the best that had appeared and still holds its ground.

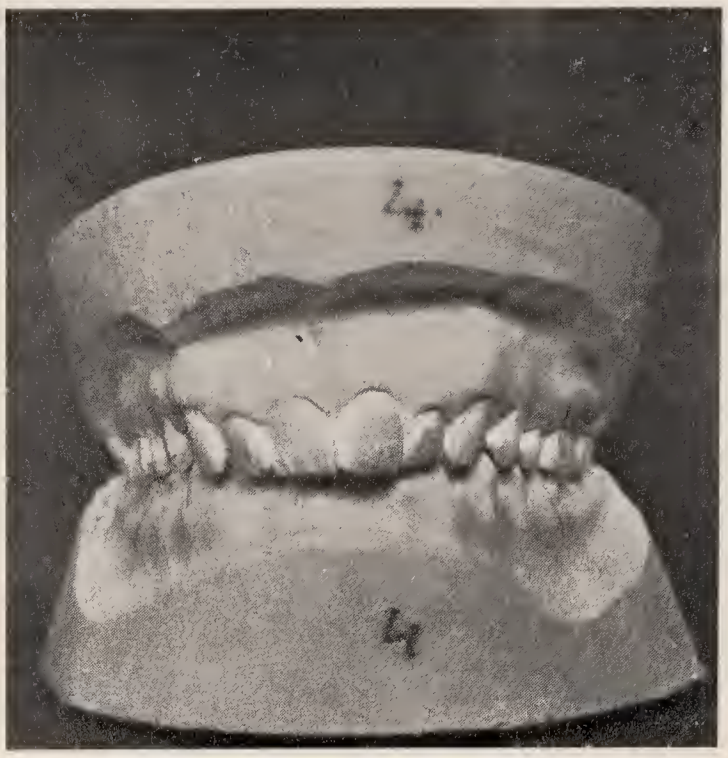
His new ideas met with considerable opposition and many still consider that his views are in some cases extreme. But that he has laid the dental profession under a debt of obligation no broad-minded

I.—Before Treatment.

II.—Before Treatment—View of Palate.

III.—Before Treatment—Profile, both sides.

ILLUSTRATING MR. PATON POLLIT'S COMMUNICATION.



IV.—After Treatment.

V.—After Treatment—Palate View.

VI —After Treatment—Profile, both sides.

ILLUSTRATING MR. PATON POLLIT'S COMMUNICATION.

man can deny, while his technical skill in devising apparatus is remarkable.

I look upon the next great milestone on the highway of progress as marked by a meeting of the Odontological Society of Great Britain on May 7th, 1900. Two papers had been read earlier in that session, one by Mr. J. F. Colyer and the other by Mr. E. Lloyd Williams on " Superior Protrusion," and, as the subject was considered such an important one, the discussion was adjourned so that a meeting could be devoted to it.

At that adjourned meeting the discussion was opened by our immediate past president, Dr. Sim Wallace, who pointed out the important part played by the tongue and facial muscles in this deformity, and that, if proper means were adopted in sufficient time, both extraction and mechanical treatment could be averted. The treatment Dr. Sim Wallace suggested was that children at an early age should be given food which compelled them to use and develop the tongue, which by its consequent increase in size would expand the jaws.

I think, with our further knowledge to-day, that Dr. Sim Wallace overrated the size of the tongue as a factor, and did not sufficiently realize the importance of the position which that organ assumed in nasal breathing in expanding the oral cavity, and counteracting the pressure of the facial muscles. But he had seized and emphasized a fact of enormous importance, and though he was laughed at at that meeting, he has lived to see that truth, and other truths he has brought before the profession, widely accepted.

The next important landmark, in this kingdom at any rate, was the foundation of this Society. It was begun in a modest way, in spite of a certain amount of opposition and of shaking of heads. But I think its three sessions have shown that it has filled a need, and it stands to-day in a stronger and better position than ever before. If it had done nothing else than bring men together to discuss their difficulties and help each other, it would not have been founded in vain. But it has done more ; its published Transactions have reached many at home and have been translated into foreign tongues, thus helping on the cause of science and health.

And what about the future ? In my opinion the greatest aim of orthodontics will be towards prevention. As the great ideal of medicine is to render the services of the doctor unnecessary, through discovering and thus preventing the causes of disease, so our ideal should be to discover and prevent the causes of dental and facial abnormality. That many of these defects cannot be absolutely rectified after a certain age—and that an early one—is a fact, though it is true we can do much to render them less disfiguring. Our task in prevention is by instructing parents and warning them of the dangers of neglecting early symptoms. They look to us for guidance ; let us hope they will not look in vain.

Gentlemen, truth is, as ever, a coy maiden whose favours cannot be won save by arduous pursuit. Happy is he who can but touch the hem of her robe. We have formed ourselves into a little band, not to create a division in dental ranks, not to push anyone's system, not for self-aggrandisement or mutual admiration, but to help each other to find out the truth in certain problems met with in our daily work and, in helping each other, to help our fellow-man.

In beginning our new session I express the hope that it may be characterized by the same spirit of scientific enquiry and mutual help which have hitherto marked its progress. I conclude with the words of Esdras the Seer—" Great is Truth and stronger than all things ! With Her there is no accepting of persons or rewards, but she doeth the things that are just. She is the strength, and the kingdom, the power and the majesty of all ages ! Blessed be Truth ! "

Mr. NORTHCROFT proposed a most hearty vote of thanks to the President for his very thoughtful and able inaugural address. It was a very great pleasure to see him occupying that position. He was sure they could promise him their very willing support during the coming session. He had always had much pleasure in attending those meetings and he was sure that he voiced the sentiments of all when he said they looked forward to a year of good work under their President's auspicious leading.

The vote was passed unanimously.

The PRESIDENT then read his paper entitled

## Mouth Breathing and Facial Contour: with a Suggested Classification.

I WISH this evening to draw your attention to certain investigations which I have been making into the abnormal variations which are found in the contour of the human face; to endeavour to explain the causes at work and to suggest a mode of classification.

Anyone whose attention has been directed to the work of regulating children's teeth must be struck by observing in any public place the deformed jaws and facial contour of a considerable proportion of the people whom he sees. It is a subject which is attracting considerable attention among the public as well as amongst rhinologists and orthodontists, while, to one who has investigated the subject at all closely, the number of people whose features have been more or less modified from the normal is astonishing.

These abnormalities are the outward and visible signs of a condition which seems to obtain in a large number of our children, namely, nasal obstruction and consequent mouth breathing. I do not ignore other causes which from time to time have been suggested, such as heredity, bottle-feeding, comforter-sucking, absence of vigorous mastication, etc., but I maintain that all other causes combined fade into insignificance before that of mouth breathing.† This vicious habit often seems to begin in infant life, becomes apparent at about three or four years and gradually exerts its baneful influence, until at the age of ten or eleven the child may have laid the foundations of lifelong deformity of the features, ruin to the teeth, deafness, and lung, throat and stomach affections.

It is not my intention to discuss the causes of adenoids even were I competent to do so, which I probably am not, but I wish to say that I do not think the affection arises from climate alone—as I have seen cases from New South Wales, Natal, Cairo, Naples, etc., nor from bottle-feeding alone, nor from race alone—it is very prevalent among the Jews in this country—nor from inefficient mastication alone, nor carious teeth alone, nor the comforter alone. Perhaps it may be a combination of these or perhaps it is none of these; we know very little about it. Certain it is that there are few affections more widely spread in this kingdom or more urgently calling for medical research. I would record my opinion that the gravity of this condition is not sufficiently realized by the general practitioner, or, if it is, he is often inclined to give way to the natural disinclination of the parents to an operation. I also wish to state

† It is outside the scope of this paper to describe the manner in which the tongue and facial muscles produce abnormalities consequent on the open mouth.

HERA.

that I have no faith in breathing exercises as a cure, in the large majority of cases ; though, where the tonsils and adenoid growths have been removed, they are often useful. In some cases they are essential, as the vicious habit may have become so fixed that these exercises and a skull and chin cap at night should be employed ; for it is very little use removing the obstruction if the evil it has produced—mouth breathing—still exists.

Why are children brought to the orthodontist ? Because there is something in their features out of harmony with the conception of beauty accepted by the community. This discord may only relate to the number, shape and arrangement of the teeth, or it may be—and in my opinion usually is—associated with abnormality in the size, position and relation of the jaws, not only to each other, but to the cranium.

Fig. 1. Normal type, showing points of measurement (in the same plane). Mandibular angle 115°, profile angle 75°. Note that the facial line is almost parallel with the Ramus. Contrast this with the Negro's skull Fig. 4, in which the corresponding lines diverge, and with Figs. 6, 7, 8, 9 and 10, in which they converge in descent.

My first proposition, therefore, is—" that true harmony of the features can only be obtained by the harmonious relationship of both jaws to the cranium." If both jaws are in harmony with the cranium it must necessarily follow that they are in harmony with one another.

There may quite well be harmonious relationship of the jaws to one another and the position of the thirty-two teeth may be perfect, but. if these belong to a negro or a Mongolian, they may fulfil the ideas of facial harmony entertained by these races, but do not satisfy ours.

Mr. Campion read a paper before us some time ago on " The Normal Dental Arch." It struck me on hearing it that it would not be out of place to make some researches into " The Normal Face," which seems to be closely connected with it and quite as

important, if not more so, as one includes the other. My first object therefore was to find some standard whereby to compare the normal with the abnormal.

To this end I first examined a number of skulls with well-developed arches and regular teeth. I had been struck by observing that the angle formed by the ascending ramus with the body of the mandible varied in different people. It is an equally true observation that the chief feature of facial abnormality is caused by the position of the mandible being anterior or posterior to its proper position. My object was to try and estimate and correlate these two phenomena. To estimate the former I took a point just in front of the ante-helix of the ear (corresponding to the glenoid cavity), the point where the ramus joins the mandible and a point in the same

Fig. 2. Boy just under ten. Normal type. Tonsils removed at the age of six.

plane corresponding to the point of the chin. This is called the mandibular angle. To estimate the latter I chose the same point in front of the ear, a point in the same plane corresponding to the base of the nose (these being probably fairly stable cranial points) and measured the angle formed by these with a line drawn from the base of the nose to the most prominent point of the chin. This I call the auriculo-facial or profile angle.

I found in European skulls of good type a great similarity in both mandibular and profile angles respectively; the former ranging from 110° to 118°, the latter from 70° to 75°. I then measured many beautiful faces of ancient Greek and Roman statuary and found that the mandibular angle averaged 115° and the profile angle 73°. I therefore take these for my ideal standard and feel justified in doing so, as Nature and Art are so nearly agreed.

I find that the mandibular angle is a very stable one amongst all the races of mankind, so far as my experience goes. I have measured the mandibles of natives from South and West Africa, Egypt, New Caledonia, Mongolia, India, etc., and find that the angle is usually from 112° to 123°, though I have found Hindoo and Negro mandibles of 125°. It is not the mandibular angle which gives the Negro his prognathous appearance. This is caused by the profile angle being large, owing to the length of the body of the mandible, the large teeth set forward in the jaws, the forward inclination of the incisors, the thick lips and flat nose. The Negro's denture is an exaggerated form of those cases we sometimes see where "the jaws are too large for the face." But the Negro's prognathism is natural, and I think it is confusing to use the same term for a pathological condition arising from totally different causes.

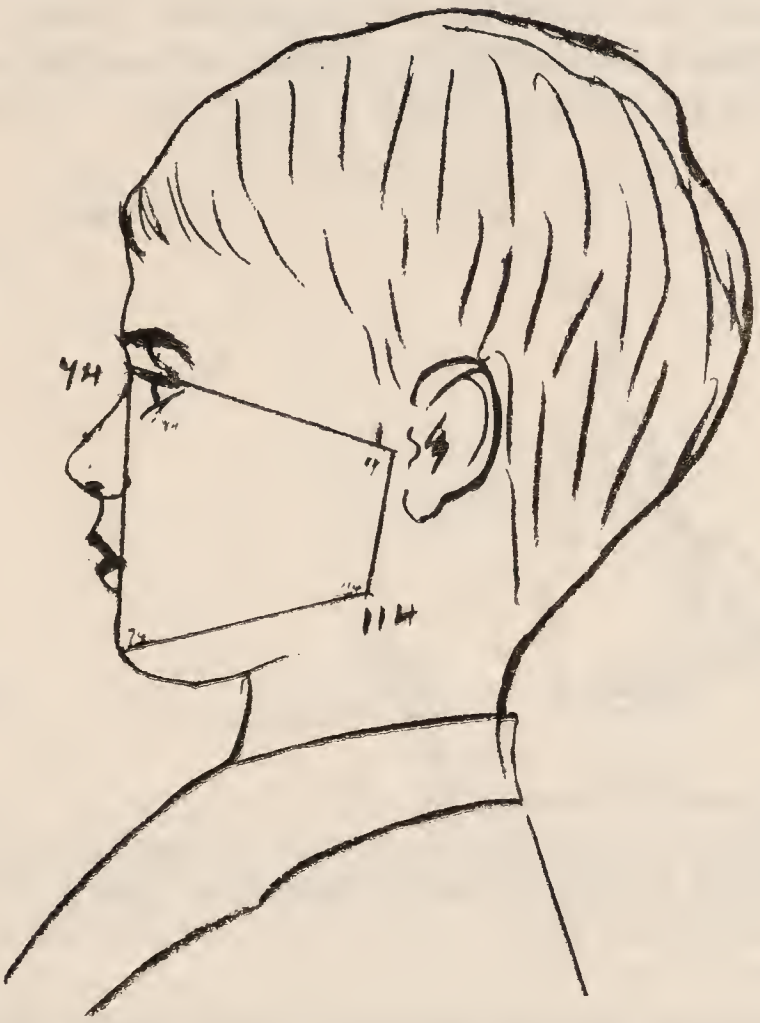


Fig. 3. Boy under nine. Normal type. Adenoids removed at the age of 5, tonsils at 8.

While on the subject of the mandible I must mention a fact probably known to you all that in early youth the mandibular angle is more obtuse than later on in life, when normal. I have measured the collection of children's mandibles in the Odontological Room at the Royal College of Surgeons. Some of them are evidently pathological, but the average runs from 140° at the first year to 130° at the third, 125° at the fifth, 120° at the ninth (one at 110°), 118° at the fourteenth. Figs. 2 and 3 show that the mandibular angle at eight or nine years of age should have lost any obtuseness.

The text books usually say that the old edentulous mandible is obtuse and approaches that of infancy, but this, I think, cannot be accepted unreservedly. I have measured all those in the Odonto-

logical Room and although four averaged 130° yet six averaged 114°, an excellent angle. There is no doubt that a certain obtuseness is obtained by absorption at the angle and we must also take into consideration the size that the angle was at maturity and, possibly, the fact whether artificial teeth were worn.

I next measured a number of children and adults, both normal and abnormal, noting the following points: Age, development of arches, facial contour, occlusion, length of mandibular ramus and body, length of facial line (from the root of the nose to the under surface of the chin), the size of the mandibular and profile angles, whether adenoids or tonsils were present or had been removed, whether the subject was or had been a mouth-breather, the size of the tongue and whether the grinding teeth were lost or were very carious.

Some of my early measurements I found useless and discarded; my present methods are probably capable of improvement, and this paper must be regarded as suggestive rather than didactic. At the same time I undoubtedly became acquainted with some facts which were new to me and which I hope you will find interesting.

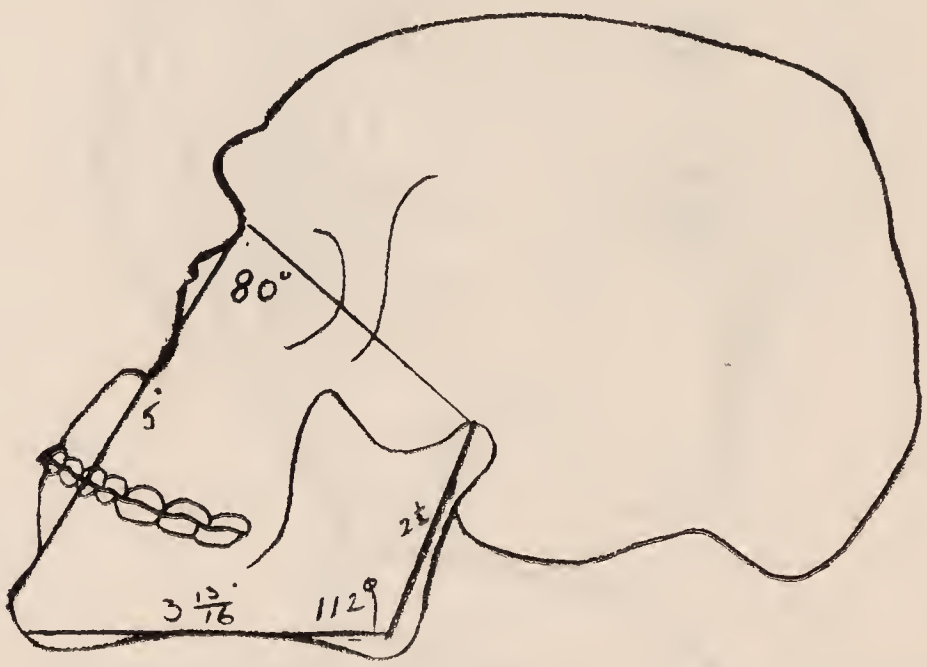



Fig. 4. Diagram of a Negro's skull (after Flower). The measurements are introduced from a Negro's skull at the Royal College of Surgeons. Note the excellent mandibular angle 112° and the large profile angle, 80°.

In the first place, my investigations on living subjects confirmed me in the correctness of the size of the mandibular and profile angles I had already found in measuring skulls and sculpture. The harmony and beauty of the face must be accompanied by a fairly close adherence to both these angles.

Next, I found that as regards the mandibular angle, no matter whether the deformity was caused by the mandible being protruded or retracted, the angle was always more obtuse than normal. With respect to the profile angle, this was larger or smaller, according to the position of the mandible, whether normal, protruded or retracted.

I found to my surprise that in cases of facial deformity the number of subjects in which the mandible was more protruded than normal was considerably in excess of those in which it was retracted. This is contrary to the conclusion expressed in Dr. Angle's latest edition.

To the ordinary observer these protruded mandible cases, except where the mandibular incisors are in front of the maxillary ones, often present no great deformity (the forward mandible may even give an appearance of "strength" to the face) and are not brought so frequently to the orthodontist. The deformity caused by retracted mandible, especially with accompanying protruding incisors, is so apparent and gives such an appearance of "weakness" to the face that it more readily offends the eye and comes more under our notice.

I have summarized my measurements, which, though probably not absolutely correct, are, I think, sufficiently near to be helpful in considering the subject.

NORMAL.

| | Length of Ramus. | Length of Body. | Total length of Mandible. | Length of Face. | Mandibular Angle. | Profile Angle. |
|---|---|---|---|---|---|---|
| Children... | 1¾ | 3⅛ | 4⅞ (130 : 100) | 3¾ | 124° | 74° |
| Adults .. | 2⅛ | 3⅝ | 5¾ (126 : 100) | 4 9/16 | 120° | 73° |
| RETRACTED MANDIBLE. | | | | | | |
| Children... | 1⅝ | 2⅞ | 4½ (120 : 100) | 3¾ | 129° | 66° |
| Adults .. | 2⅛ | 3 | 5⅛ (107 : 100) | 4⅞ | 134° | 65° |
| PROTRUDED MANDIBLE. | | | | | | |
| Children... | 1 13/16 | 3 3/16 | 5 (119·5 : 100) | 4 3/16 | 132° | 74° |
| Adults .. | 2 1/16 | 3 5/16 | 5⅜ (110 : 100) | 4⅞ | 137° | 76° |

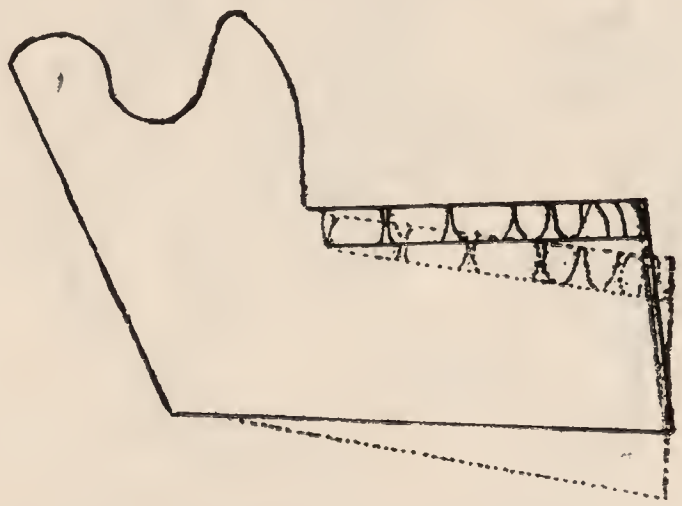


Fig. 5. Diagram showing the difference between a mandibular angle of 118° and 135°, supposing the Ramus to remain stationary. Such a difference in an adult jaw would mean a lengthening of the face by ⅜ of an inch.*

The chief points to be noted in the above tables are that in those cases chosen as approaching the normal the total length of the mandible is considerably greater than the length of the face; in the two other classes the mandible is proportionately shorter and the face longer. In the normal the proportions between the children's and adults' measurements remain very stable; in the abnormal classes the abnormality is worse in the adult than in the child, that is to say, the angle has still further increased and the face lengthened. The foregoing diagram, Fig. 5, will demonstrate this.

In these cases not only is the face lengthened, but it is also narrowed from the temples downward. It also becomes shallower from the front backwards, owing to the obtuseness of the angle and the non-development of the mandible. From a series of measurements at the British Museum I have come to the conclusion that the pro-

* This probably has some connection with the phenomenon of "open bite" also.

portions of the width and length of the ideal face accepted by the Greek sculptors were as follows :—Width of face (measured from the widest part of the zygomatic arches) is to the length of face (measured from the nasion to under surface of chin) is as 108 to 100 (see frontispiece). Measurements of young children show that the face is proportionately wider, about 130 to 100. The few measurements I have taken of abnormal adult faces with an average mandibular angle of 125°, show that the width of the face is only equal to the length of it, the proportions being 100 : 100.

When the mandibular angle is considerably enlarged the mandible is as a rule either retracted or protruded. In retracted mandible the phenomena are fairly well shown in Fig. 6.

The term "superior protrusion" is an unscientific one and should be discontinued. It is used to denote a condition in which the lower lip is placed between the upper and lower incisors when

Fig. 6. Youth aged 17. Had adenoids and tonsils removed a year ago, but still a mouth breather. Long narrow face ; large mandibular angle 128° ; small profile angle 63°. Observe the downward and backward drag of the muscles shown by depressed alæ of the nose, short upper lip and retracted mandible ; general aspect of the face convex. Upper incisors crowded but not protruding. Narrow arches. The facial line and Ramus are shown to converge slightly as they descend.

the mouth is closed. It is usually found in those cases in which nose breathing has been re-established after the deformity has been caused, and is generally as much mandibular retraction as maxillary protrusion, or it may result from thumbsucking. But that the condition may occur where the mandible is not retracted is shown in Fig. 7.

Between the extreme types of retracted and protruded mandibles there is found every degree of profile angle, but all show the lengthened narrowed face and enlarged mandibular angle. A fair specimen of the intermediate class is found in Fig. 8.

When the incisors in these cases meet edge-to-edge or produce a cross bite the facial irregularity does not increase; but when the protruding mandible becomes free from the restraining influence of the maxilla, when the forward thrust of the mandible enables the lower incisors to erupt anterior to the upper ones, or when the bite is open enough, we get a lamentable deformity, one which tends to become worse in time, especially if the maxilla is narrow and the mandible wide, or if occlusion is made closer by the loss of grinding teeth. As this is the worst type of deformity to treat, it is of immense importance that it should be recognised in the early stages. In some of these cases the mandibular angle is enormous, as in Fig. 9.

Another case of this deformity associated with open bite is seen in Fig. 10.

Fig. 7. Girl of German parentage aged 19. Racial features modified by mouth breathing. Tonsils removed when 13. Mandibular angle large, 135°; profile angle fairly normal. Open bite. A true case of "superior protrusion," but this term inadvisable.

The determining factors causing the mandible to be protruded or retracted in mouth-breathers I do not know; but I suggest that the mandible is held in the direction of least resistance, to enable the child to breathe with the least effort. I have not sufficient data to go upon, but most of the cases of protruded mandible have been asociated with enlarged tonsils. The size of these alone is often a considerable factor and probably in addition necessitates a downward and forward action of the tongue and facial muscles.

Dr. Angle places these extreme cases in a class by themselves, but this seems to me to be unscientific. I feel inclined to place all cases in which the mandible is protruded in their proper denomination, irrespective of the fact that the lower incisors are

Fig. 8. Youth aged 19. Mouth breather and has large tonsils. Long narrow face (100 : 100) ; mandibular angle large 128°, but profile angle good and facial contour not unpleasing. Both arches narrow ; teeth crowded ; cross bite. Note everted lower lip, which belongs to the protruded and not to the retracted mandible ; upper lip not short nor alæ nasi depressed.

Fig. 9. Girl aged 11. Mouth breather ; has large tonsils. Maxillary arch narrow, mandibular well developed. Mandibular angle very large, 145° ; profile angle also large, 76°. Note everted lower lip ; no "down drag." Converging lines of Ramus and facial lines very marked. Mesial occlusion to the extent of half an inch. Facial aspect concave.

anterior to the upper ones. It is simply a case of difference of degree, not of kind.

The object of the foregoing measurements is not only to investigate phenomena and their causes, but also to suggest a rational means of gauging cases of abnormality and to enable us to convey to ourselves and to others the conditions existing in any subject we examine.

The classification of patients by dental models only is not sufficiently comprehensive ; we must also take into account the harmony of the features. In many cases of dental irregularity the features are not concerned, and, in many of those which are, correct occlusion and facial improvement go hand in hand. But there are many cases in which confusion may arise and treatment may be

Fig. 10. Man aged 27, has large tonsils, complete nasal stenosis and is very deaf. Open bite. Mandibular angle large, 130° ; profile angle also large, 77°.

wrong if a dental classification only is used. It seems to me that although a dental classification is necessary, a facial one is also requisite.

More with the object of obtaining your help and eliciting your criticism than with that of placing a finished scheme before you, I have ventured to draw up a classification. Knowing the normal angles we can readily discover any abnormality of the jaws, and mark it with its proper sign of plus, minus or cypher, with the distance in millimetres, according to whether it is anterior, posterior or in accordance with our standard. If the mandibular angle is correct we can tell by the profile angle how much the maxilla is abnormal ; if the profile angle is correct, although the mandibular angle is abnormal, little or nothing can be done to improve the latter, except in the earliest stages.

## Classification.

Position of Jaws in Relation to the Profile Angle.

| | | |
|---|---|---|
| Mx.O | Mb. O | = Normal. |
| Mx.+ | Mb. O | = Thumbsucking, etc. |
| Mx.+ | Mb. + | = Negroid type. |
| Mx.+ | Mb. − | = Angles Class II. Div. I. ? |
| Mx.O | Mb. − | = ,, ,, II. ,, II. ? |
| Mx.− | Mb. O | = *e.g.*, Harelip. |
| Mx.− | Mb. − | = Absence of teeth : non-development. |
| Mx.O | Mb. + | = Varieties of Angle's Class III. |
| Mx.− | Mb. + | = |

The importance of a classification of this kind is that it leaves the orthodontist free to adopt any measures he may deem best to obtain regularity both of features and arches. I do not undervalue the importance of perfect natural occlusion, but I think this may be purchased at too high a price. I value more highly a result which can be attained by the quickest and simplest means after studying how both functional utility and appearance can best be obtained. I have no overweening respect for a complete set of thirty-two teeth ; they were given us by Nature, but so are many things which are functionless or a source of trouble. If better and quicker results can be obtained we should not hesitate to resort to extraction rather than condemn our young patients to wear appliances, perhaps for years, to their discomfort and perhaps to the detriment of the periodontal membrane. Cases of my own and others, in which extraction has been resorted to as long as twenty years ago, I often see. The remedy was speedy, the condition of stable equilibrium more easily obtained and the articulation perfectly functional.

You will notice I have said little or nothing about the maxilla. It is not that I underrate its importance ; it is the feature about which parents are usually most perturbed. But the maxilla is more sinned against than sinning, and can be more easily reduced to the normal than the mandible. The proper place of the upper lip is just in front of the lower one (see Figs. 2 and 3), and if we can get the lower one into its proper place there is no great difficulty in adjusting the maxilla, in the large majority of cases, so that the upper lip falls into its proper place.

I will now finish this imperfect sketch by briefly recapitulating my conclusions.

All irregularities of the features, apart from congenital and traumatic sources, are caused by the abnormal relations of the jaws to the cranium.

These abnormalities are generally caused by continuous abnormal muscular action, the outcome of the vicious habit of breathing wholly or partially through the mouth in early youth.

They are invariably associated with an increase in the mandibular angle and with a diminution of the length of the mandible as compared with the length of the face.

The profile angle may be less, equal to, or greater than normal ; the two angles taken together form a useful guide for classification and treatment.

The varying angles are probably accompanied by well-defined conditions of the dental arches. The conditions of both facial

and dental abnormalities described together in a formula should exhibit a scientific record of any case.

## Discussion.

Mr. NORTHCROFT thought it would be unfair if the Society allowed such a thoughtful and original paper to pass without any comment. At the same time, he wished they could reintroduce the system, which they tried to adopt when the Society first started, of having *résumés* of important papers supplied to members before they came to discuss them. It seemed to him that the President's paper was full of new thoughts which needed to be carefully considered before they could rationally discuss it. He might, however, comment on one or two points. First, he was struck by the extreme difficulty in locating the exact point from which the mandibular angle was taken. In the illustration of the negro skull, one could see that the measurements could be started from several different points, the angles thereby being all slightly different. Another important thing which was not mentioned at all was the full face appearance. The President had only dealt with the profile. It seemed to him that one of the advantages of the latest prosopometric measurements was that they gave us the width of the skull roughly, so that one could co-relate that with the teeth and the jaw. If we found a certain width we knew whether it would be advisable or not to expand the jaws in the molar region. Another interesting point was that Dr. Law, of Berlin, had read a paper in which he claimed that intra-maxillary traction reopened the angle of the jaw, which had too early become a right angle. He thought the President had pulverized that theory absolutely by showing that in post-normal and pre-normal occlusion a strongly marked obtuse angle occurs in each case.

Dr SIM WALLACE said he was extremely pleased to have heard such a suggestive and original paper. He had frequently thought of the importance of noting the conditions which might be observed by looking at the side of the face instead of only looking at the conditions which were revealed from a study of models only, but he was now convinced of its importance. He would like to refer to the causation of adenoids. Mr Rushton had said that the medical profession should try to elucidate the cause and there was not the slightest doubt but that they should, but unfortunately they might and probably would be a long time about it, while the dental profession might and could do so at once. Doctors were afraid of being considered unorthodox and it might be that adenoids resulted to a great extent from carrying out what is at present the orthodox teaching of the medical profession. He believed that members of the dental profession, by a very simple method, could prove that the principal cause of adenoids was cold and damp air. Moreover, the point is of great importance to us as most of the gross irregularities of the teeth result from mouth-breathing. He thought, however, that if they did know the cause of adenoids fairly well, they had a working hypothesis which every dentist was in a position to verify in his daily practice. Statistics showed that in Italy adenoids were very rare, but in England and Sweden they were very prevalent. In Austria, he understood, that the proportion of children having had adenoids was certainly not above 5 per cent., whereas in London about 47 per cent. of school children have or have had them. In Australia adenoids are relatively rare, though in the colder parts and more especially in Tasmania, they are fairly frequently to be found. In the Thames valley they are particularly prevalent, but a chalk soil with a fairly dry air, *e.g.*, Margate, is a place which is recommended for those threatened with adenoids. It was recognised that cold and damp air lowered the vitality and the power

of resistance to bacterial infection, and thus predisposed the mucous membrane to repeated catarrhal attacks. It is true that diseases which attack the throat in a virulent way, *e.g.*, diphtheria and scarlet fever, were sometimes followed by adenoids and consequently, adenoids might occasionally be contracted even where the climate was not cold and damp, but this does not get over the fact that in the great bulk of cases adenoids are either directly or indirectly the result of cold and damp air, often gratuitously introduced into children's bedrooms. He agreed with Mr. Rushton that a serious attempt should be made to elucidate the causes of adenoids, because obstruction to nasal breathing was the cause of the most marked irregularities of the teeth.

Mr. NORTHCROFT enquired as to the technique of the measurements.

Dr. F. M. SANDWITH said the public should look upon the dental profession as the saviours of mankind, but such was its general ignorance that he *had* heard members of their profession abused! They needed an institute of dental hygiene for prevention of disease in teeth. If the dental profession took up a scientific position on the question of adenoids, it would deserve and obtain such recognition as it had never done in this country as yet. He agreed that doctors in general were not sufficiently interested in this matter. He was not sure how far we were justified in blaming our climate. He had seen cases of adenoids in Egypt, where in Cairo they only had a rainfall of 1¼ inches in a year—as much as often fell in 24 hours or a week in England. They were not only concerned with the beauty of the face, but adenoids did harm by their bad effects upon the chest and breathing, for which they were primarily responsible. The removal of adenoids was of little value unless breathing exercises were carried out afterwards. He assumed that this question interested them, because they not only wished facial deformity removed, but the Greek standard of beauty restored.

The PRESIDENT pointed out the need for classification of phenomena. There was much to be done by young workers in taking observations.

Mr. HOPSON suggested adjourning the discussion to a future meeting, when they would have had the advantage of reading before discussing the very valuable paper which the President had read. Possibly some of them might collect photographs and other materials which would assist the discussion and afterwards be available for reference. He proposed a vote of thanks.

The PRESIDENT, in response, said he should regard an adjournment of the discussion as a great compliment, and he would then be better prepared to reply to criticism. Answering Mr. Northcroft, he would confess at once that his methods were not characterized by absolutely mathematical correctness. He would be happy to show his technique and measure some of the facial angles of those present. Mr. Northcroft mentioned that a full face view had not been given, but there were many other things he had not had time to give. For instance, he had taken for granted that the ascending rami were similar in elevation in every case, but they varied somewhat. They might ask why mouth-breathing brought some jaws forward and others backward. He held it was because the child put its mandible backward or forward to achieve the most comfortable position. Dr. Sandwith had alluded to the *Machoire Anglaise*, which was familiar in continental comic papers, and it was in some respects a typical adenoid face. The curious thing was that we had gone on so long without recognising the importance of these growths.

Mr. MELLERSH seconded Mr. Hopson's motion for adjournment, as the paper gave much food for thought. This was agreed to and the meeting adjourned.

# ORDINARY MEETING.

An ordinary meeting of the Society was held at the rooms of the Medical Society of London, 11, Chandos Street, Cavendish Square, W., on Wednesday, February 8th, 1911, Mr. WILLIAM RUSHTON, President, in the chair.

The minutes of the last meeting were read and confirmed.

## A Case of Dilaceration.

BY MR. WILTON THEW.

Mr. THEW: This is the photograph of the upper model of a boy whose age is about ten. About the normal time his right lateral incisor came through, but for a long time the left lateral incisor was absent. It came through, however, not many months ago and in the curious position shown. The tendency apparently was for the roots of the lateral and the central incisors to diverge. Various suggestions were made as to the possible causes of this condition, which persisted, the divergence of the roots tending to increase rather than decrease. It was suggested that possibly there was a supernumerary tooth between the roots and an X-ray photograph was taken, and the next slide shows the result. The lateral incisor has a very curious appearance, the root being at right angles to the crown, the pulp canal of which ends in a trumpet-shaped opening. Also there is apparently the ghost of something that looks very much like a second root with a root canal running up and diverging towards the end. The possibility of this deformity was not thought of when the case was seen. The patient will be coming up again in about three months' time and I propose to wait and see what happens before undertaking any treatment.

The PRESIDENT asked whether Mr. Thew had any suggestion as to how the ghost effect was produced.

Mr. THEW said he could not say. He had not been able to obtain any history of injury and he did not think there was any very definite history.

The PRESIDENT hoped Mr. Thew would bring the case again before the Society later on.

Mr. J. H. BADCOCK said the case recalled to his mind one that was described, he believed, before the old Odontological Society within the last five years, but Mr. Thew had looked up the records and could not find it. It was a tooth very similar to the one shown that evening and a similar curious trumpet-shaped opening. The root was bent at an angle to the line of the crown and at the point of divergence was the trumpet-shaped opening. In that case the tooth was extracted. There was a considerable opening through which a probe could be passed *via* the trumpet-shaped opening into the pulp cavity of the tooth.

Mr. CARL SCHELLING suggested that it might be found in the future that the canine tooth in erupting had by its absorbent organ absorbed away a great part of the tooth in front of it. He had himself had a case of a central incisor absorbed in a similar manner by a canine erupting, and he could find by the probe a large cavity under the gum. To save the patient any further pain he had to kill the pulp in the central, filling the large cavity under the gum with gutta-percha. It appeared to him the case shown might possibly be a somewhat similar condition, and later on Mr. Thew might be able to say whether he could get a probe into the cavity of absorption. His own patient was a young lady of fifteen whose canine was delayed in its eruption.

The PRESIDENT said that Mr. J. G. Turner had a theory that a good many such cases were caused by the pressure of an abscess sac in the

temporary dentition, and perhaps Mr. Thew could say whether that was a possible cause in the present case.

Mr. Thew said he did not see the child at the time, but there was no history of anything happening in that region of the mouth.

## A Note on the Normal Development of the Jaws.

By Dr. J. Sim Wallace.

As some members may not have been here the other evening when I showed this case on the screen, I will ask that it be put on once again. This (Slide 1) represents the model of a boy's mouth aged $9\frac{3}{4}$, and the measuring apparatus you will notice shows five centimetres in breadth from the buccal side of one second temporary molar to the same point on the other side. In the next slide (Slide 2) you will see the scale in the same position, but it does not nearly touch the two second premolars as they were touched in the previous diagram. This second slide represents the model of the same mouth at the age of $3\frac{1}{2}$, and you see that the premolars have travelled outwards. We knew that that happened from the measurements of Dr. Grevers. His measurements, however, were made from examination of numerous skulls of dead children, but by measuring successive models of the same child we observe the same result. When I spoke about these models the other evening Mr. Northcroft wanted to know whether I had any definite idea as to how the result had been brought about. I think it has come about from deposition of bone externally and absorption of bone internally, together with the outward translation of the temporary teeth. I do not think that any interstitial growth takes place. The deposition of bone appears to take place in a similar way to the growth of the body of the maxilla, by periosteal deposition at one part (externally) and absorption at the other, *i.e.*, the lingual surface of the lingual alveolus. The recognition of this change is of importance in connection with the question of regulation, because models have been exhibited to show the excellent results which were brought about by the treatment of very young cases where there was a certain amount of crowding in the incisor region. If the operator had waited for a few years it is quite probable, if there were no continuance of the causes that had prevented proper development of the jaw, that there would have been sufficient normal expansion to get the same results as have been obtained by artificial expansion. I think the cause of this external translation of these deciduous molar teeth cannot be explained on any other theory than what I might call the tongue theor . Something must have pressed them outwards and what that something was I do not know if it were not the tongue. There were two or three things in this case that tended to make the tongue effectual in pressing the teeth outwards. Leaving aside mouth breathing, because the patient was not a mouth breather, the boy was addicted from very early years to masticating food which required mastication. The only regulation which need be mentioned here for his diet was that he should not have bread soaked in milk, porridge and milk puddings. The teeth consequently were worn down as you will see in the models, and the vertical depth of the mouth was consequently a little decreased, and probably that helped to aid the pressure of the tongue. From chewing the food effectually there was no tendency of the teeth to rise up in their sockets. Looking at them in the model you will see they are well sunk into the bone. Consequently the tendency would be for the tongue to force the teeth outwards on account of the vertical depth not having increased. The third thing that I thought was of importance in keeping the jaw developing normally was that the mouth was not in a chronic

## MR. THEW'S COMMUNICATION.

A case of Dilaceration.

Fig. 1.

Fig. 2.

---

## DR. SIM WALLACE'S COMMUNICATION.

A note on the Normal Development of the Jaws.

Fig. 1.

AT AGE $9\frac{3}{4}$ YEARS.

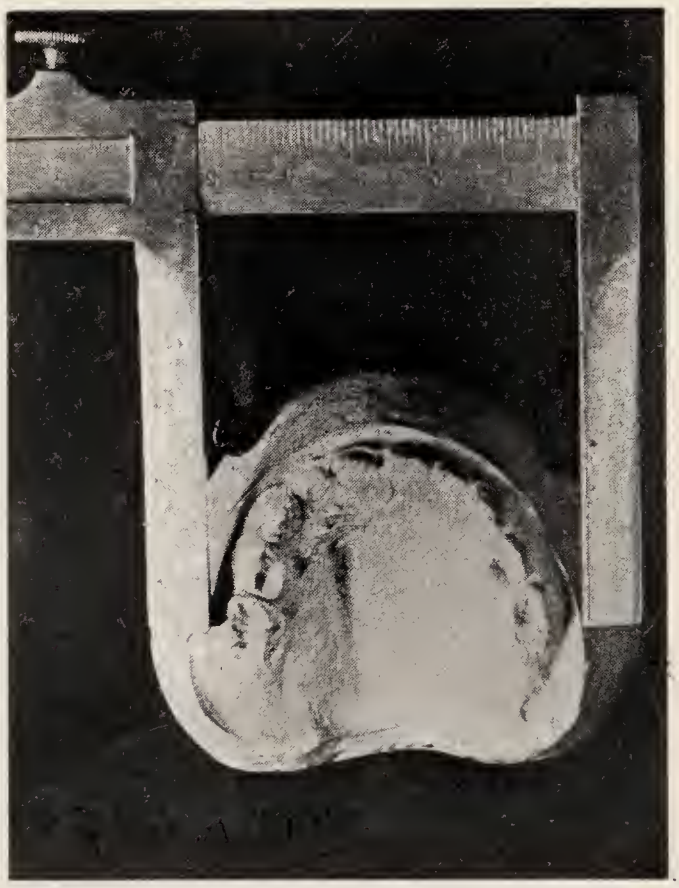


Fig. 2.

AT AGE $3\frac{1}{2}$ YEARS.

# MR. HIGHTON'S COMMUNICATION.

## Orthodontical treatment complicated by an impacted upper canine.

Fig. 1.

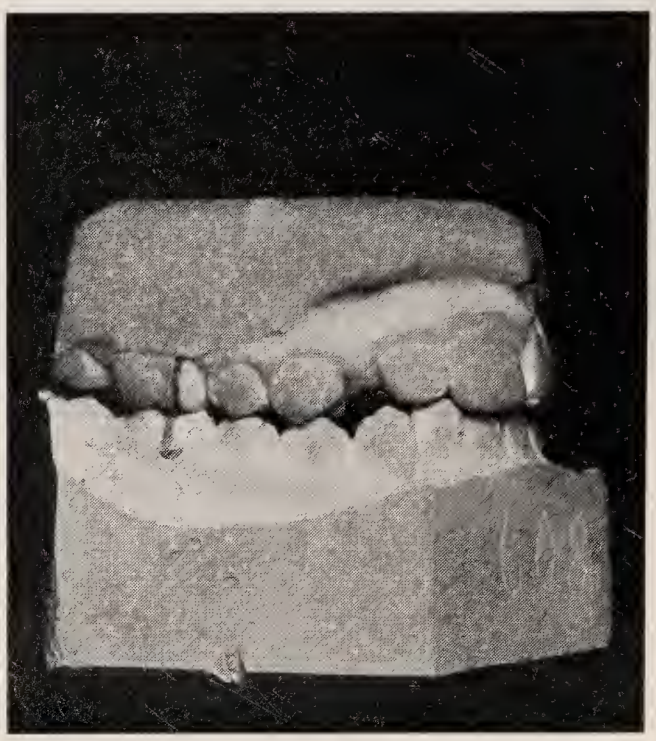


Fig. 2.

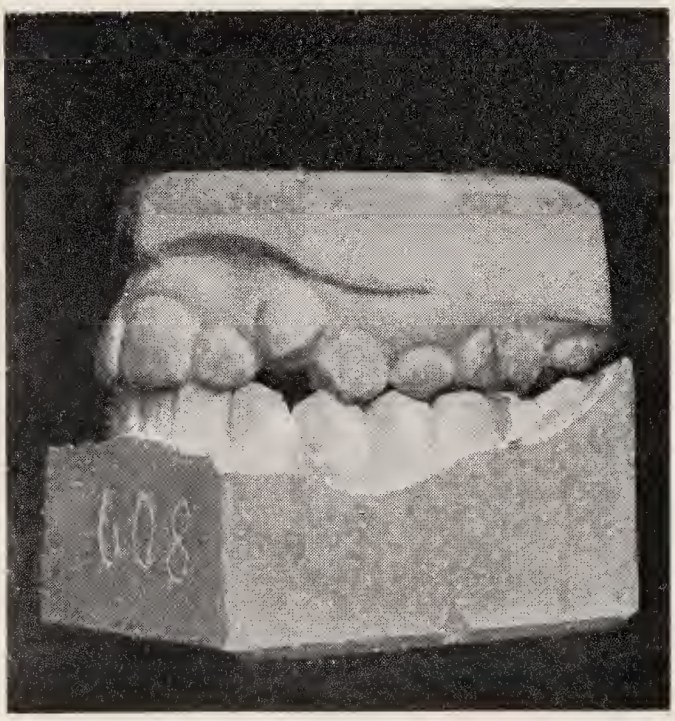



Fig. 3.

Fig. 4.

# MR. HIGHTON'S COMMUNICATION.

## Orthodontical treatment complicated by an impacted upper canine.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 1.

Fig. 2.

Fig. 3.

state of fermentation as is usual in the mouths of children fed on soft foods. The science of dietetics, as currently taught, does not consider whether the mouth is left in a hygienic state or not, as long as there is plenty of nutrition in the food. But unfortunately nutritious food is very liable to ferment, if it lodges in the mouth. With a healthy alimentary canal the boy seemed to retain the ordinary chubbiness that should be characteristic of all normal children. As I said he was not a mouth breather. At one time there was a certain amount of trouble ; the tonsils became enlarged and ultimately were removed, but adenoid vegetations did not come on, at least to any great extent. If, however, the conditions which brought on the trouble with the tonsils had been allowed to continue I believe the adenoid vegetations would have come on and the nasal respiration would have been blocked. But about that time, however, I came to the conclusion that cold and damp air had something to do with adenoids, and after removing that source of irritation (open windows in cold and damp weather) the boy has been particularly free from colds and I do not think that since he was six years old he has ever breathed through his mouth, even when he has had a cold. If he had been a mouth breather there would have been a collapse of the sides, because the tongue could not possibly have pressed out the teeth by normal pressure. Certainly the teeth would not have been translated outwards ; in fact there would have been a contracted arch. When mastication is thoroughly performed the pressure of mastication tends to cause a deposition of bone where it is most wanted to resist the strain of mastication ; in other words, there is a tendency to increase the deposition of bone on the outer surface of the maxilla, and as the nasal breathing was good, the function of the antrum was normal and, from all appearances, he has a large antrum. The appearance of the boy indicates that his superior maxilla has been well developed and no doubt he has a correspondingly large antrum.

Mr. G. Northcroft said that in the treatment of very young patients it had been his practice to watch the patient for some little time to see if there was any indication of normal spacing in the incisor region. He wanted to draw attention once more to the great importance of taking models of patients from the very earliest ages so as to be able to watch the growth and obtain positive knowledge as to whether normal development was taking place or not. He thought that if, after a period of one or two years, there was lack of normal development, it was quite justifiable to call in artificial means to stimulate that development. He flattered himself that he had produced very good results by this method. He quite appreciated the fact that a jaw might be expanded unnecessarily, but he did not think any careful dentist would operate unless he thought it was quite necessary and advisable.

Mr. J. H. Badcock thought it was instructive to have it pointed out that expansion occurred normally, and to have some idea of the amount which occurred. He did not follow Dr. Sim Wallace's description of the growth of the jaw. He understood him to say that in his opinion the expansion which took place all round the arch was caused by the absorption of bone externally and the deposition of bone internally.

Dr. Sim Wallace said it was the other way round ; the deposition externally and absorption internally.

Mr. Badcock thought that would make the jaw smaller.

Dr. Sim Wallace said he imagined that the teeth had by some force or other been brought into a position whereby the alveolus was absorbed on the surface nearest the tongue. As the boy had no alveolus at hat point, there must have been periosteal deposition of bone on the

outside of the external alveolar plate into which the teeth were gradually translated.

Mr. J. H. BADCOCK, continuing, observed that Dr. Sim Wallace said that as the teeth were wider than they were before something must have pushed them out. He did not think that was proved. It seemed to him the teeth might have been translated outwards by some such force as translated them downwards, the force of eruptions about which nothing was known. It seemed to him that to say because they had gone out they must have been pushed out was begging the question.

Mr. SCHELLING said he did not understand Dr. Sim Wallace's notion that because the bone was not there it must have been absorbed. It was quite possible that there might have been growth down the middle line of the palate, and the alveolar processes might have moved laterally teeth and all. He did not think it was conclusively proved that absorption had taken place.

Mr. J. E. SPILLER suggested that the temporary teeth were translated outwards in the course of mastication in order to keep pace with the lower temporary molars which were also being translated outwards by another force, possibly the tongue, affecting the lower teeth and the upper ones having to go out to keep pace with them.

The PRESIDENT thought it reasonable to suppose that something might be put down to the natural growth of bone. Dr. Sim Wallace had trotted out his favourite war horse, mastication, but if the child had breathed through his mouth instead of through his nose all the mastication in the world would not have made that arch what it was. The arch was well developed, chiefly because the child breathed through his nose and not through his mouth. With regard to artificial expansion, he was certain that it was sometimes necessary ; but he was also quite certain that in many cases natural expansion, brought about by turning the child from a mouth breather into a nose breather, was not only possible, but was the right thing to do. He had seen two cases within the last month. One was a boy he thought would require treatment, but the boy had had his adenoids removed and had become a nose breather, and in the last six months his arch had expanded so satisfactorily that probably artificial expansion would not be necessary. The other case he had seen that very day, a girl whose arch he expanded some years ago. She was then and still was a mouth breather. He found that during the years that had elapsed his work had been entirely undone by the very cause which produced the original irregularity. If that girl had been changed from a mouth breather into a nose breather that arch would have remained wide. Mastication should not be ignored, but it sank into insignificance by the side of nose breathing.

Dr. J. SIM WALLACE, in reply, said Mr. Badcock was under the impression he had assumed it was the tongue that pushed the teeth out without a fair consideration of other things. Of course, he had considered other things, but had put forward what was his own opinion as he could not go into all the various other hypotheses that might possibly be suggested. The reason he had come to the conclusion that it was not some internal vital force, such as the force by which teeth erupted, was that because if the mouth were held open in such a way that the pressure of the tongue did not force the upper teeth outwards, then outward translation did not take place.

The PRESIDENT said there was the pressure of the muscles inwards, and Dr. Wallace apparently had not taken that into consideration.

Dr. SIM WALLACE said he had. Sometimes the amount of narrowing corresponded to the amount that the teeth should have been translated outwards. The amount of narrowing, for instance, at the age

of 10, might be 5 mms., and yet this might simply result from the fact that there had been no translation of the teeth either inwards by the pressure of the cheeks on the outside and no translation outwards by the pressure of the tongue from the inside. Anyhow, he had come to the conclusion that the tongue theory gave quite a sound explanation and there was no need to invoke more complicated factors for another explanation. With regard to Mr. Schelling's idea that there might have been growth in the median line, the answer was that the model showed a very considerable space between the two central incisors at the age of $3\frac{1}{2}$, and that practically did not increase in size any more than the other spaces. If it had been along the middle line the spacing would have been solely in the middle line and the two central incisors would have shown a very large gap, 5 mm. or more, because it would be necessary to add the first millimetre or so that originally existed. Moreover, the lower arch of teeth showed a similar broadening to the upper. Consequently he came to the conclusion that it was not by growth along the middle line. With regard to Mr. Spiller's remark as to the primary pressure being on the lower teeth, he had thought of that and considered it was a factor. Not only were the upper teeth pressed outwards by the tongue, but the lower teeth were pressed outwards also, the occlusal surfaces normally necessarily keeping the normal relations constant. With regard to natural growth of bone, he believed that natural growth of bone did take place when the natural stimulus for such growth was present, but unfortunately it very often did not, and therefore he did not particularly speak about it. There was a tendency for things to go right if correlated parts were normal, irregularities only took place when things were not normal.

## The Treatment of Adhesions between the Cheek and Gums.

By Mr. Coleman.

Adhesions between the cheek and gums may be divided into the congenital and acquired.

*Congenital.* Arise from a failure in development of the lip furrow from the oral margin of the jaws. This condition is seen in cases of complete bilateral hare-lip, where not infrequently the central portion of the lip and the alveolus (endognathion) are united in one mass and tethered to theb ase of the nose. Less extensive union is seen in the condition known as a prominent frænum labii.

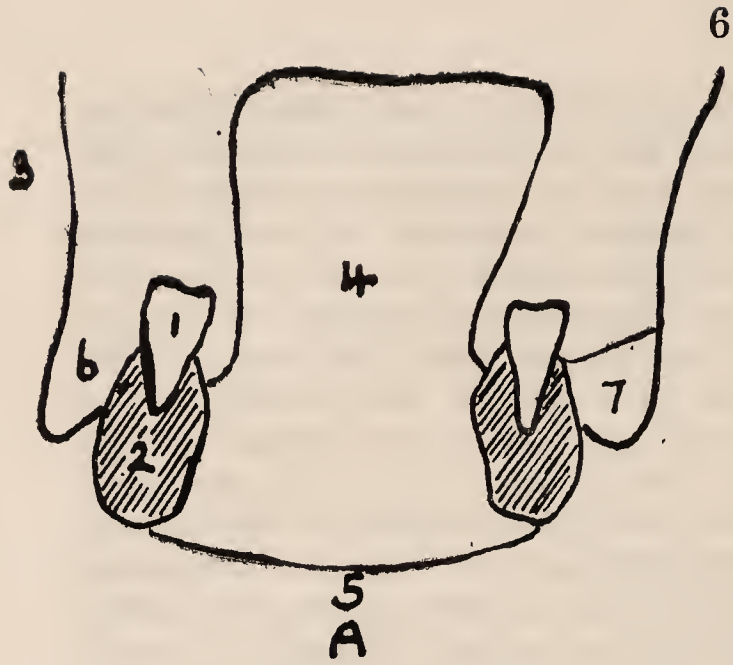
*Acquired.* A. Local. Arise owing to the protrusion of a necrotic root through the gum causing abrasion of the cheek, the contiguous ulcers on the gum and cheek coalesce and granulate up, thus forming the future adhesion. The tooth at fault is almost invariably a lower temporary molar and, hence, the common position of these bands is in the premolar region.

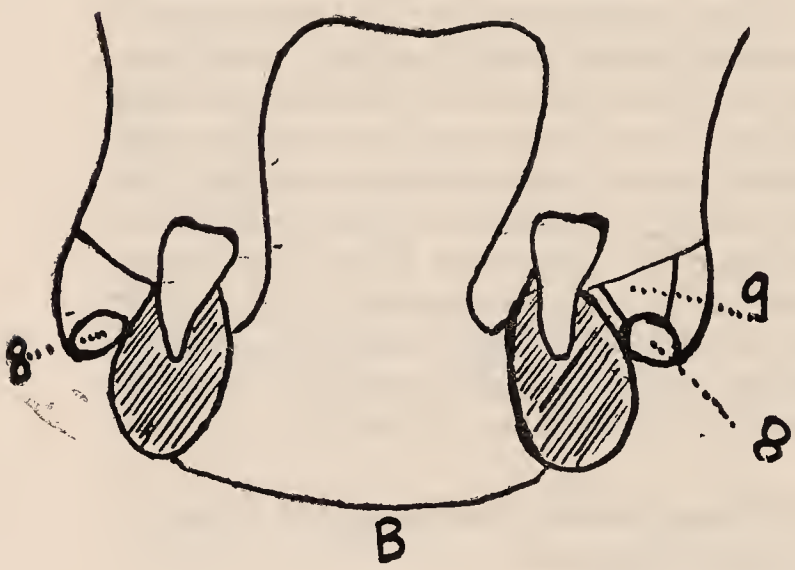
B. General. Arise from ulcerative stomatitis, burns, scalds, syphilitic ulceration, etc.

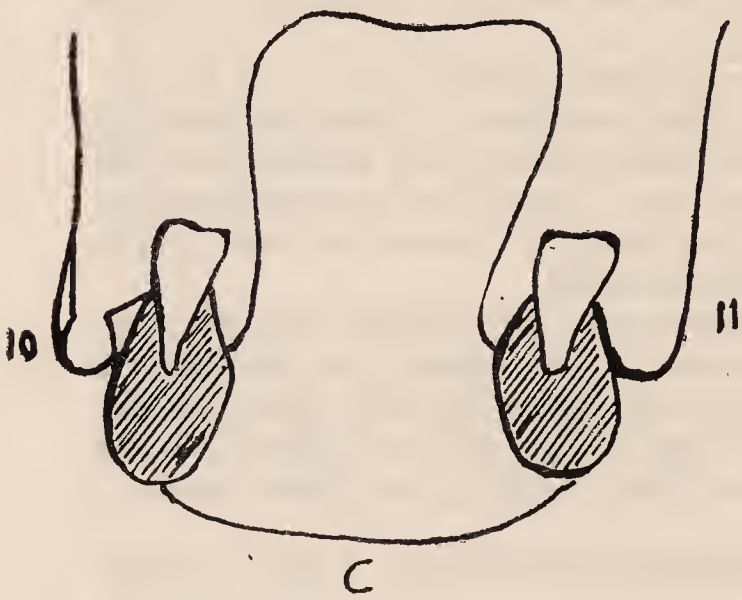
*Treatment.* Surgical interference may be desirable for the following reasons :—

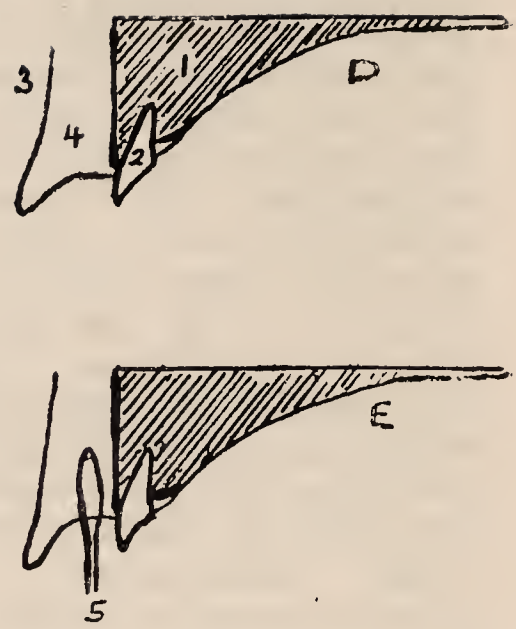
1. To allow full movement of the jaw.
2. To correct irregularity of teeth.
3. For the adaptation of dentures.

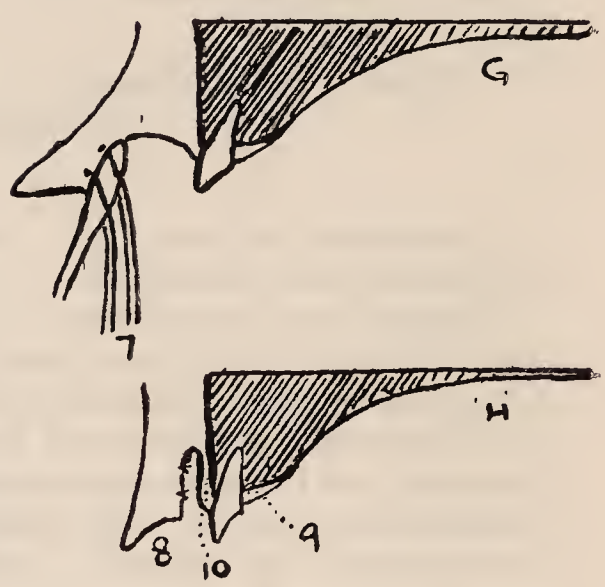
Acquired adhesions (local). Tunnel base of adhesion with a narrow backed scalpel, tenotome or antrum perforator (Fig. B8). Pass a strip of ribbon gauze through tunnel and loosely tie over bridge of tissue. Leave gauze *in situ* for a week or two until canal has cicatrized. Remove overlying bridge of tissue (Fig. B9). The raw surfaces being well separated (Fig. C10) and the angle of the wound originally formed




Coronal section through lower jaw in the Premolar region.

1 Tooth.
2 Jaw.
3 Cheek.
4 Tongue.
5 Deep cervical fascia.
6 Cheek sulcus.
7 Adhesion between cheek and gum.
8 Tunnel made in adhesion.
9 Bridge of tissue to be removed.
10 Raw surfaces left after removal.
11 Normal condition restored (see A6).

Sagittal section through Palate in Central Incisor region.

1 Hard palate.
2 Central Incisor.
3 Lip.
4 Frænum labii.
5 Spencer Wells' forceps placed on frænum.
6 After division between forceps and alveolus.
7 Two Sutures placed around forceps
8 Forceps removed and Sutures tied.
9 Frænum between incisor teeth left *in situ*.
10 Alveolar stump of frænum.

by the canal cicatrized, there will be but little opportunity for the edges reuniting. The operation is on the principle of one that is employed for webbed fingers, where similar difficulties present themselves.

Congenital adhesions. The same method may be adopted in dealing with a prominent frænum labii or the following :—

Grasp frænum with narrow-bladed Spencer Wells forceps close to alveolus (Fig. E8). Divide tissue between forceps and alveolus (Fig. F6). Under-run forceps with two or three silk stitches (Fig. G7).

Remove forceps and tie sutures (Fig. H8), alveolar stump of frænum needs no stitching, as edges do not gape (Fig. H10). Frænum between incisor teeth (Fig. H9) will degenerate after its function has been removed and can be kept *in situ*.

Remarks. Any method which allows the angle of the wound to become cicatrized before division of the main mass of adhesion will prevent reunion of the band.

The simple division of these adhesions between the cheek and gums is unsatisfactory, the parts involved reuniting more vigorously than before, and so increasing the deformity. Dressings placed over the raw surfaces will not remain long in position, owing to the movements of the mouth and an extension from a vulcanite plate into the newly formed sulcus does not appeal as a rational means of preventing this reunion, seeing that pressure anywhere in the body produces ulceration or retards healing if this be already present.

Mr. Harold Chapman asked whether he had understood correctly that in the last case the frænum was divided between the Spencer Wells forceps and the alveolus, and then the sutures put in, or were the sutures put in first and then the frænum cut.

Mr. Hedley Visick said Mr. Coleman had pointed out that it was unnecessary to remove any part of the frænum between the incisors, and he had always rather dreaded the operation of taking away the frænum and part of the septum between the teeth for fear of injuring the peridontal membrane. Apparently Mr. Coleman thought it was unnecessary to remove that part as it naturally atrophied when functionless, and he thought that was quite a good idea. It would be useful to know whether Mr. Coleman used a local anæsthetic for the cutting of the frænum and whether he found it influenced the healing in any way. He should also like to know whether the gauze drain was left in for the whole ten days or a fortnight, because it appeared that it would get into a very foul condition after the third day, judging from the experience of drains left in the mouth. It would be also interesting to know whether there was any serious secondary hæmorrhage after removal of the drain or when the drain was changed, because it appeared to him that such a wound must be in a sloughing condition for the first two or three days and there might be a tendency for secondary hæmorrhage. Also, had Mr. Coleman any reasons to offer for the adhesions between the cheek and gums being most common in the lower jaw.

The President asked whether Mr. Coleman always used stitches in his cases.

Mr. Densham asked at what age the second operation, that on the frænum, might be performed.

Mr. Coleman, in reply, said the frænum was first cut between the forceps and the alveolus before suturing, the idea of the forceps being to make the suturing rather easier. The stitches could be put in quite well without the forceps, but it simplified the matter to leave them on as they kept the tissues steady. With regard to Mr. Visick's question as to local anæsthesia, it was far and away the most satisfactory. The tissue was very easy to infiltrate. Some of the first cases he did under general anæsthetics, but he had since used local anæsthetics and

found them satisfactory from almost every point of view. The patient was steady and there was plenty of time. One slight objection to local anæsthesia was that the tissue swelled up and the landmarks were a little bit obscured, but by waiting until the anæsthetic had been absorbed that difficulty was overcome. With regard to the gauze drain, it was apt to get rather foul even if it was left loose and removed from time to time. He had been thinking of using a ring of metal instead of the gauze. He had not had much trouble with hæmorrhage, but he could quite understand that it might follow, though it would be easy to control by putting a piece of gauze through and drawing it taut. It was, however, far better to anticipate it and therefore avoid it. With regard to adhesions being more common in the lower jaw, they certainly were far and away more common. He thought it was generally the roots of the lower temporary molars which protruded through the gum in the lower jaw more than in the upper, and it was rather surprising not to see it more often in the upper. With regard to the necessity of stitches, the question asked by Mr. Rushton, it made rather a cleaner operation to put two or three stitches in, but they were not absolutely necessary. Stitches certainly brought the edges nicely together and the whole thing healed up rather more quickly. As to the age of operating on the frænum, he thought the sooner the better. As soon as it was noticed to be doing harm the operation should be performed and that would be practically always after the central incisors were through, say, at about seven years.

## Orthodontical Treatment Complicated by an Impacted Upper Canine.

By Mr. H. C. Highton.

I have been requested to bring before the Society this evening as a case in practice, one which was complicated during treatment by the impaction of the right upper canine.

The case is one of Angle's Class II., Division II., and as shown by the first lantern slide has double post normal occlusion of the teeth of the lower dental arch with retrusion of the upper incisors. The patient is a girl of fifteen and a half years of age, and the treatment was commenced two and a half years ago, and it was intended to place the teeth in normal occlusion by means of arches and intermaxillary traction. There was no history of mouth breathing, and the lips closed normally; but there was crowding of the upper teeth in the canine region. The arches were not abnormally narrow, there was not a great amount of overbite of the upper incisors and the teeth of the lower arch were fairly regular in their arrangement.

The initial treatment of the case was undertaken in the ordinary manner by means of clamp bands, arches and intermaxillary ligatures, and good progress was made for about four months. The second and third slides illustrate the result of this treatment at this time. It will be observed that the left upper canine has erupted in the meantime external to the arch. The right upper canine shows no sign of approaching eruption. A radiogram was taken at this stage to locate the position of this tooth and it was found lying high up in the arch, and pointing forwards in an abnormal direction.

As the patient had to be away at school for some time, active treatment was suspended and a retention device was inserted, and whilst at school the case was watched by a friend, the idea being to complete the case if possible during the next holiday, but unfortunately treatment was deferred and the retention device allowed to remain in position.

Before the next holiday a report was received that the right upper lateral had become so loose that a radiogram was again suggested. The canine was discovered to have caused very extensive absorption of the lateral root, necessitating its immediate extraction.

The fourth slide illustrates the extent of the absorption of the lateral root which progressed without the slightest discomfort or indication of pathological change to the patient. During the holiday the left upper first bicuspid was also extracted, the left upper canine retracted and the expansion of the upper arch allowed to relapse, and it was hoped that the right upper canine would erupt more or less normally in the space previously occupied by the lateral and this treatment was continued during the next school term.

The desire was now to complete the case as quickly as possible, since an ideal result was quite out of the question.

At the next opportunity for treatment the radiograms shown on the fifth and sixth slides were taken, which clearly indicate the dangerous position of the right upper canine. The slides show the canine taken from the posterio-anterior direction in an oblique position and apparently touching the apex of the right central incisor.

After carefully considering the case it was now decided to attempt to extract the canine and replant it in the normal position.

Continuous gas was administered, the tooth removed and rinsed in a solution of hydrarg perchlor. (1 in 2000) and held in a piece of antiseptic lint whilst the pulp was removed through the crown, and the canal thoroughly cleansed and filled. The tooth was replaced in a newly made socket with firm pressure and the alveolus moulded around it with the fingers and a splint applied. This consisted of a gold band encircling the two adjoining teeth, the right central and first bicuspid, with a cast band enclosing the replaced canine. This was made by having previously fitted the bands to the central and bicuspid and placing them in position after the completion of the operation of replantation and taking a composition impression whilst the patient was still under the influence of the anæsthetic. From the model obtained, wax was moulded in the desired position in the lingual and buccal surface of the canine, invested and gold cast by the pressure method. The splint was removed after ten weeks, when the tissues appeared normal and the tooth quite firm in its socket, and the patient had suffered very little discomfort. The models shown on slides 7 and 8 were taken six weeks after the splint had been removed, a vulcanite case being worn in the meantime to retain position of the left upper canine.

The PRESIDENT thought Mr. Highton was to be very much congratulated on his courage.

Mr. GEORGE NORTHCROFT also congratulated Mr. Highton on his pluck and thought the case presented many interesting features. He believed the treatment was sound and showed amongst other things the extreme value of radiography. The only thing he doubted was whether from the position from which the last radiogram was taken, the approximation of the canine to the central root was not more apparent than real. If the radiogram had been taken full face an actual space might have been shown between the tip of the canine and the central root. It would be exceedingly interesting to know how long the transplanted canine remained. The experience of most operators had been that within from three to five years replanted teeth had their roots reabsorbed and the tooth was finally lost; but if a patient at that age was able to keep a tooth for as long as five years it would be a gain, and he thought Mr. Highton was to be very heartily congratulated.

Seeing his name upon the agenda of the meeting to open a discussion on Mr. Highton's paper, he had brought some slides that he thought closely bore on the lessons to be gleaned therefrom. He thought one might have anticipated a similar result had an operation attempted been such as that which Mr. Highton had already shown. The first slide illustrated the right profile. The left profile showed the side of the mouth where absorption might have occurred had any attempt at correction been made. The third slide (the occlusal view) showed the first upper left premolar standing in front of the left upper canine. He had not had a radiogram taken, but as far as he could judge the apex of the canine was behind the apex of the first premolar. His report upon the case was as follows : " It might be possible, by lengthy treatment, and constant visits, to reverse the positions of the first left premolar and canine ; under the circumstances, however (especially as there is always a risk of absorption of the roots of one or both teeth), it would be best to remove the first upper premolar, at the same time getting rid of the second upper temporary molars on each side. But this does not complete the treatment, as it is essential that the right side of the lower jaw should be lengthened ; in other words, the right lower canine and lateral must be restored to their natural positions from which they have become displaced owing to the early loss of the lower temporary molars. With a short course of treatment it would be possible to render the right side normal, and the teeth functional. If this is found to be impracticable, the loss of the first two premolars on the right might have to be considered."

He had brought the case forward especially with reference to the treatment of the left upper side and wanted criticisms as to whether he was right in suggesting the removal of the first premolar. Mr. Lockett had observed the backward movement of the front lower teeth after extraction rather than forward movement in the molar region, and he thought slide 3 amply proved that. The occlusion of the first four molars was absolutely normal. There were 14 mm. space in the left side of the lower premolars and only 11 mm. on the right side, showing that 3 mm. of space had been lost owing to the backward movement of the right lower canine tooth. Another case similar to Mr. Highton's had come under his notice; the patient had passed out of his hands but he had heard that an absorbed lateral was subsequently removed that was almost the facsimile of that shown by Mr. Highton, only the canine erupted normally without any complication with the central incisor.

The PRESIDENT said both cases presented points of interest, although they were not absolutely on all fours. Personally, in Mr. Northcroft's case he should be disposed to extract the bicuspid.

Mr. SPILLER had his doubts whether Mr. Northcroft did quite the right thing in recommending extraction, and he feared that when the child was a few years older the centre would be found to have gone quite over. Personally, he should be inclined to extract the $\frac{4}{4}\frac{4}{4}$ in both jaws for the sake of saving the centre and the appearance of the child.

Mr. HEDLEY VISICK said Mr. Highton's case reminded him very much of a case he had intended to bring up at some future date. The patient came to him at the age of nine and a half with one of the narrowest jaws he had ever seen. The upper bicuspids were inside the lower bicuspids, and the lateral in the upper was almost touching the bicuspids, the canines not having erupted. The best thing to do, he thought, was to get an expansion, but unfortunately, being one of his first cases, he did not think of having a skiagram taken. He obtained a very marked expansion in the upper, but after about a year of treatment

patient complained of pain in the upper left lateral which was becoming loose. Two months later the tooth was very loose and he extracted it under a local anæsthetic and found it had no root whatever ; it was absorbed to the very last piece. Things went on fairly satisfactorily for another month and then the patient complained of pain in the right upper first bicuspid. That was found also to be absorbed to the extent of about two-thirds of the root. He had seen the patient that afternoon, nine months after the extraction, and the result was not particularly pleasing. The canines had come through, but they looked rather bad, on the left side particularly. The canine was close up against the central and there was a small space behind it. On the right side the spaces were closed up completely and the canine had come down into the place from which the first bicuspid was extracted. Unfortunately he also expanded the lower jaw, which was slightly crowded, and the result was that there was now a tendency on the part of the upper jaw to relapse and the lower jaw looked distinctly overcrowded. The lower right first bicuspid was getting pushed out of the arch again. As a matter of fact the lower jaw was too big for the upper. It was a case very similar to that of Mr. Highton's and the most trying case that could be imagined.

Mr. CHAPMAN asked how Mr. Highton made the band for the canine —whether he made a band from another canine or was enabled to take an impression from the canine he extracted. He congratulated Mr. Highton on the excellent results he had obtained under the circumstances.

Mr. HIGHTON, in replying to the discussion, said he found on attempting to extract the canine that it was close up against the central root, almost overlapping at the tip. With regard to the subsequent result, he should be very pleased ultimately to bring forward at some future date a radiogram of the case so that all the members might see what had happened. With regard to Mr. Chapman's question, he was afraid he had not made himself sufficiently clear with regard to the application of the splint. He replaced the canine under an anæsthetic, having previously fitted bands to the right central and the right first bicuspid. He put those in position, and although the canine was still loose he moulded round the canine with soft composition and when it had set hard removed this, being very careful not to alter the position of the tooth. Then he removed the band from the central and the bicuspid and cast in the ordinary way.

The thanks of the meeting were accorded to the members who had brought forward communications and those who had taken part in the discussion.

The meeting then resolved itself into a Special Meeting for the purpose of considering an amendment to Bye-law XXXIII. Bye-law XXXIII. reads : "It (the Council) shall meet one hour before each Ordinary Meeting, or oftener, should it see reason. Three shall form a quorum." The amendment before the meeting was "That Bye-law XXXIII. read as follows :—"It shall meet before each Ordinary Meeting, or oftener, should it see reason. Three shall form a quorum."

The PRESIDENT in moving the amendment, said it was simply done for a matter of convenience, so that when there was not sufficient business to occupy the Council it need not meet a whole hour before the meeting.

Mr. NORTHCROFT suggested that the Council under the amended Bye-law might meet on an evening before the date of the meeting if it wished.

The PRESIDENT thought it might, and if it was the intention of the Society that the Council should meet immediately before the meeting it would be necessary probably to add that word.

It was pointed out by another member that the words " or oftener " permitted a meeting to be held other than on the evenings of the meeting of the Society, and on the amendment being put it was carried. Bye-law XXXIII. now reading : "It shall meet before each Ordinary Meeting, or oftener, should it see reason. Three shall form a quorum."

The Society then adjourned until March 8th.

# ORDINARY MEETING.

An ordinary meeting of the Society was held at 11, Chandos Street, Cavendish Square, W., on Wednesday, March 8th, 1911, Mr. J. H. Badcock (Vice-president) in the chair.

The minutes of the previous meeting were read and confirmed.

The following gentlemen were balloted for and duly elected :— Mr. B. Maxwell Stephens, L.D.S., Eng., of 76, Grosvenor Square, W., and Mr. J. D. MacKechnie, L.D.S., Edin., of 27, Queen Anne Street, W.

## Orthodontic Referendum.

Mr. E. R. Tebbitt exhibited a chart that had originated from a discussion in the British Dental Association as to the necessity of an Orthodontic Referendum. The idea was that when a man felt rather doubtful about the treatment of a case he was not always able easily to get another opinion, and it was thought that he should enter particulars of the case upon the chart and send it round to a small committee of two or three members, who would give independent opinions. The form was designed for full face and side face photographs, and particulars with regard to the case, such as age, sex, previous treatment, probable cause, etc., and the models were numbered. Questions also were asked with regard to adenoids, tonsils, the condition of the nasal septum, harelip, character of the patient, home and school locality, etc. The paper was filled in and signed and sent to the Secretary. He did not think the committee to whom the paper was sent by the Secretary would ever be divulged, and the committee would be entirely a committee of the Southern Counties Branch, B.D.A.

BRITISH DENTAL ASSOCIATION.

Southern Counties Branch.

ORTHODONTIC REFERENDUM.

Photographs.

(Full-face.) (Side-face.)

1. Models numbered .....Date taken.....
2. Age.....
3. Sex .....
4. Previous treatment ? .....
.....
.....

5. Probable Cause ? .....
.....
6. Condition of Teeth ? .....
7. Adenoids ? .....
8. Enlarged Tonsils ? .....
9. Deflected nasal septum ? .....
10. Harelip ? .....
11. General Health ? .....
12. Temperament ? (*e.g.*, " good patient," " difficult patient," etc.).
.....
13. Home Locality ? .....
14. School Locality ? .....
15. Remarks.

(Signed)

To be filled in and forwarded with Models to the Hon. Secretary, Southern Counties Branch, British Dental Association.

Mr. J. E. Spiller then read a paper entitled

## A Classification of Dento-Facial Irregularities Based on the Mechanical Factors of Causation.

It is with great hesitation that I venture to bring " Classification " before you to-night, for so much has been written on this subject that it would seem dangerous to attempt to formulate any new hypotheses or successfully to co-ordinate the various factors which separately or in combination constitute those abnormalities known as dento-facial irregularities.

Broadly speaking, there are two kinds of classification—the " artificial " and the " natural." In the former choice is made of certain convenient characters for division and re-division into a certain number of groups or classes. The object of the latter is said by John Stuart Mill to be " to provide that things shall be thought of in such groups, and those groups in such an order, as will best conduce to the ascertainment and remembrance of their laws."

From the literature of Orthodontics it would appear that the subject has been approached from two standpoints having some resemblance to the above, *viz.*, the etiological, by the scientist, and the strictly practical, by those gentlemen whose only concern apparently is to put thirty-two teeth into what they are pleased to call " normal occlusion." One is forced to confess that too frequently the results of the former method are of only limited practical value to the orthodontist, while those of the latter, although convenient, are too often based on hypotheses which do not successfully bear scientific investigation. Between these two methods there is a large breach, and my present desire is to make such superficial survey of the subject as is possible within the limitations of a short paper, with the hope of stimulating interest in, and discussion of methods which may be of practical use, and yet have a scientific basis.

With this object in view I have wished to abandon all preconceived ideas, and to approach the subject in such manner that the result should have special regard to mechanism of causation, accuracy of diagnosis and treatment.

Before attempting to classify dento-facial irregularities, it would appear necessary to consider in some detail the factors of these irregularities in complete separation, remembering that an irregularity is rarely the result of any single factor, but is in reality the product or combination of several, and frequently of a large number, which again may exist in any degree. These factors may be considered under three headings, *viz.*, those concerning

1. The Jaws.
2. The Dental Arches.
3. The Teeth.

This arrangement is open to criticism on several grounds, but I have found it convenient as a working basis, and believe it to include every point of primary importance. I now propose to consider in some detail certain of the factors concerning the above.

I. THE JAWS. (The Maxillæ considered primarily in independence of the dental arches.)

Their normal and abnormal positions. Variations in three directions may theoretically exist, *viz.* :—

1. The Vertical.
2. The Lateral.
3. The Antero-posterior.

Of these I venture to disregard the first two, as these factors would unnecessarily complicate the subject ; they are extremely controversial and beyond the scope of this paper. Certain manifestations of them are considered later. The third, however, is of great importance.

Normal and abnormal antero-posterior positions of

(a) The Maxilla

The Normal

(b) The Mandible

1. The Normal
2. The Post-normal
3. The Pre-normal.

(a) The Maxilla.

The antero-posterior position of the maxilla must be considered I suggest, as normal to the individual. This statement, apparently so directly in conflict with recent papers by our President and Dr. Sim Wallace, may seem a rash one. Let me therefore hasten to amplify it.

In the first place it is essential to differentiate between a normal maxilla and one the shape of which is associated with altered proportions of the maxillary dental arch. Either of these may occur in the prognathous type or its converse.

The antero-posterior position of the maxilla of normal shape may vary in relation to the cranium according to the race of the individual, and other circumstances (such as heredity) ; but the consideration of these belongs more rightly to the science of anthropology. It is, however, possible for the maxillary arch to be pre-normal in a maxilla of normal antero-posterior relations, except

in so far as the alveolar portion of the anterior part of the jaw is concerned. This is not a true displacement of the jaw, and is considered later.

Again, the maxilla may be elongated or shortened, with a corresponding manifestation in the dental arch, but this must be regarded as an interstitial change and not as a variation in position of the maxilla.

(b) The Mandible.

The mandible in contrast to the maxilla, and on account of its freedom of movement, may be in one of three positions in relation to the remainder of the head, and these must be considered separately. Here, at once, is a definite basis of Classification and one which, I suggest, deserves to be adopted as such on account of its simplicity no less than because it is founded on definite facts. All dento-facial irregularities primarily fall into these three groups, which may be named as follows :—

| | | |
|---|---|---|
| The Normal | Class I. | |
| The Post-normal | Class II. | Each of which may be unilateral. |
| The Pre-normal | Class III. | |

Class I.

So much has been written on the normal position of the mandible that I think it necessary to indicate only what appears to be essential. Just as no physician would be foolish enough to diagnose a case from one symptom only (unless such symptom were known to be pathognomic) we must consider both the facial and the dental conditions in any case for diagnosis. Of these the facial ones may be taken first.

In cases uncomplicated by any abnormality of the dental arches, if the facial area corresponding to the mandible is in harmony with the remainder of the face, it is strong evidence that the mandible is in correct antero-posterior position. But, as the infallibility of even the trained eye as a guide cannot be admitted, the usefulness of the methods of profilometry, prosoprometry, and Mr. Rushton's system of measurement of facial proportions is apparent. Race, as well as family characteristics, must not be forgotten.

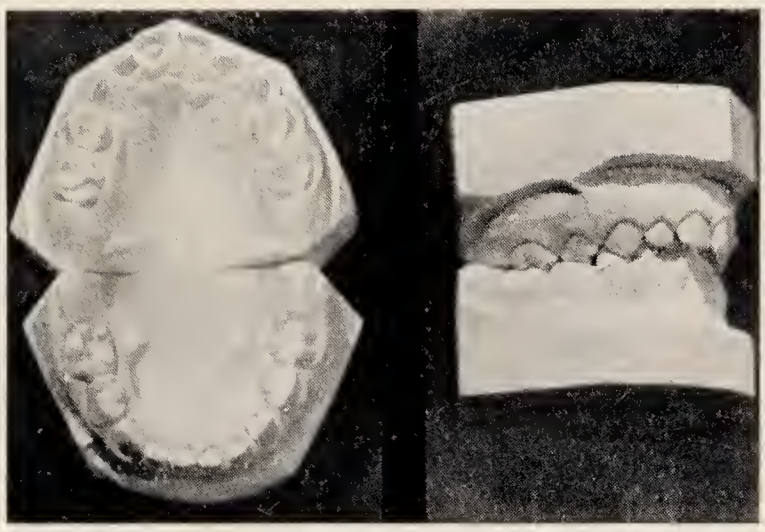
The inter-dental characteristic of Class I. is the normal antero-posterior relation of the first permanent upper and lower molar teeth (or, if these are unerupted, of the second temporary molars), provided that these teeth are in correct position in the jaw. But their position—especially the maxillary ones—is so frequently a wrong one (as will be shown later) as to render them worthless as a sole diagnostic factor. Hence the necessity for the recognition of the correct antero-posterior position of the first molars. This, as Dr. Sim Wallace has shown, may be determined by the following methods :—*

> " If the subject is young all that is required to be done is to examine the teeth of the temporary dentition and observe the amount of crowding. This may be calculated from the amount that the spaces which normally should exist in the temporary

---

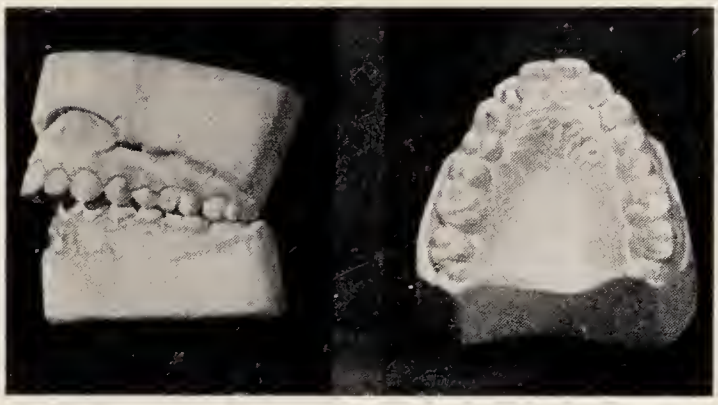
*" A Classification of Dento-facial Irregularities." Trans. Odontological Section of the Royal Society of Medicine, June, 1908.

I.



II.

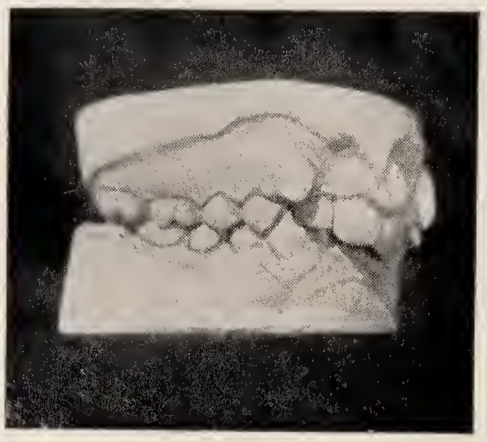
IV.



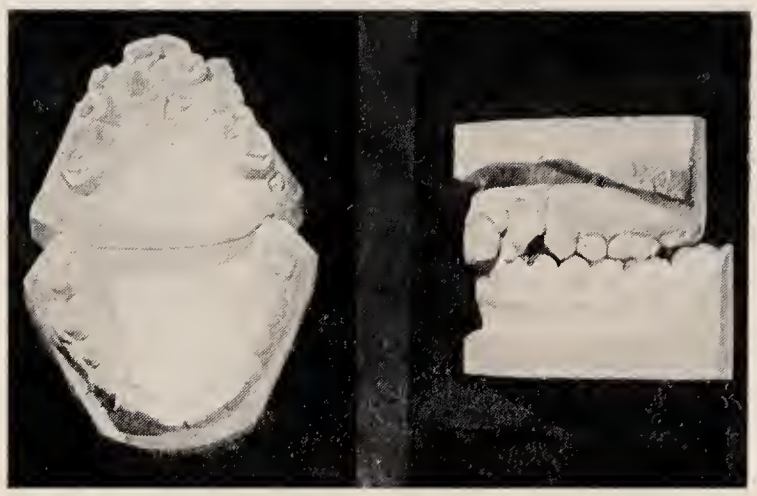
III.

V.

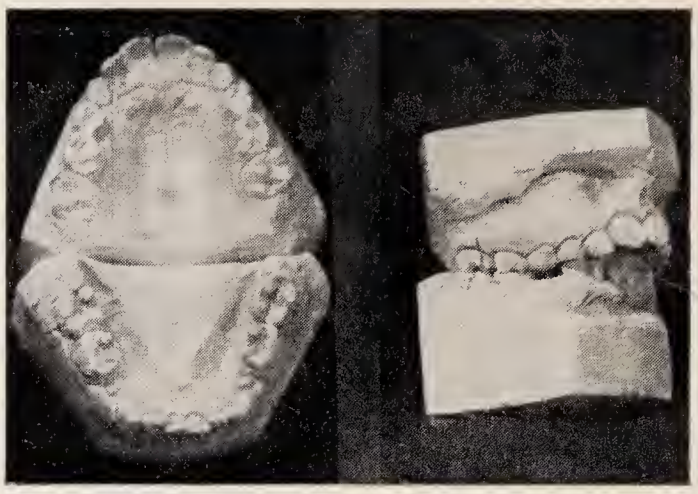
VI.



VII.



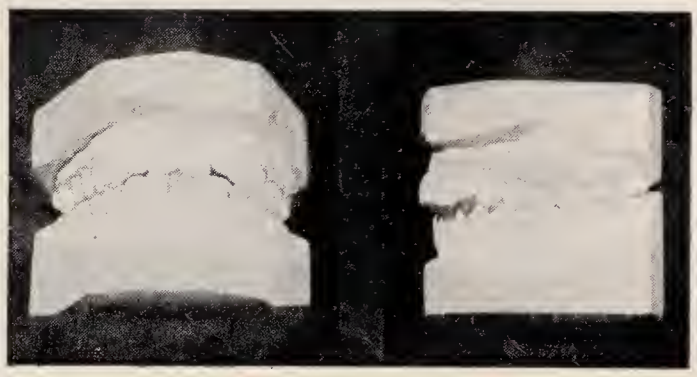
VIII.



IX.

X.

XI.



XII.

XIII.

XIV.

dentition have been obliterated by the crowding forward of the teeth from behind, and generally, to a small extent also, by the lack of intermaxillary development. In many cases approximal caries or extractions have to be considered, for it often happens that approximal caries allows the first permanent molar to be pushed forward, and this may occur in both the upper and lower arch. The amount of contraction thus observed must, of course, be calculated in addition to the amount obliterated by the crowding out of existence of the normal spaces between the temporary teeth. The models of both upper and lower teeth should, of course, be studied in arriving at a diagnosis from this point of view.

When there has been extraction of temporary teeth, it must be observed whether the space remaining is equal to the normal mesio-distal diameter of the missing tooth plus the normal spaces between the neighbouring teeth. Similarly, when most of the permanent teeth have erupted, the amount of anterior displacement of the first molar may be most certainly gauged by the lack of space for the normal arrangement of the teeth. If, for example, a canine or pre-molar is completely out of the arch formed by the rest of the teeth, it may be presumed that the position of the first molar is a whole tooth forward in relation to the body of the mandible or maxilla, unless it is observed, from the direction of the incisors, that there has been retrusion of the crowns of these teeth. This does occur at times, and must be considered if accurate diagnosis of the malposition of the first permanent molar is to be made."

I think the above quotation should be supplemented by the statement that a pre-normality in varying degree of the whole upper arch, from the first molar forward with all the teeth in normal alignment, may exist, giving rise to a true superior protrusion, also that the amount of retrusion of the crowns of the incisor teeth, more especially in the mandibular arch, is not always a correct guide to the amount which they have moved distally, and so the pre-normality of the lower first molar may be exaggerated.

Classes II. and III.

In abnormal antero-posterior positions of the lower jaw (*i.e.*, in Classes II. and III.) the facial conditions must be considered in the same way as suggested in Class I., and a diagnosis should be made from these in conjunction with the dental conditions.

The amount of abnormality is most conveniently measured—taking all the precautions set forth for the determination of their correct position—by the occlusion of the first molar teeth. A complete post- or pre-normality may be termed one in which the mandible is post- or pre-normal to the extent of the mesio-distal diameter of the anterior cusp of the first upper molar, but as any degree of variation may exist, the case must be classified as belonging to that class to which it most nearly approximates, and if it is impossible to decide this point it may be expressed as Class I.—II. or Class I.—III. Each of these classes may also be unilateral, in which case it should be expressed in this manner : Class I. Unilateral or Class II. Unilateral.

Class II. (fig. 1.) then may be defined as that condition in which the mandible is post-normal more than one-half the width of the antero-posterior cusp of the first upper molar tooth, but it must be emphatically stated that the occlusion of the first molars shall not be taken as the only guide. If their actual position is (by chance) the correct one, then their occlusion is a sufficient guide. But as it is so frequently otherwise, all that was above stated in reference to the determination of their correct position applies with especial force here. Let no misrepresentation on this point exist: the accuracy of diagnosis of Class II. is of the greatest importance, and the results of wrong diagnosis—although evident—are so disastrous, that I may be forgiven for giving the following illustration, which has a direct bearing on this subject.

I have recently examined a number of Angle's Class II. symmetrical cases, taken at random. Of these the classification of 52 per cent. was due to the pre-normality of the upper first molars, and the remaining 48 per cent. to a post-normality of the mandible, or about one-half was due to each of these causes, and I believe these figures approximately represent the proportions, at least in this country. If these cases were treated by the *soi-disant* apostles of facial harmony in the old routine manner, *i.e.*, by the advancement of the mandible or jumping the bite, the result would be a pre-normality of both arches, or a double protrusion in half the cases. If treated in what I understand is the later or more fashionable method, by the distal movement, or tipping back of the first upper molars and the teeth anterior to them, the result would be a post-normality of both arches, with a corresponding facial deformity in the remaining half.

The Mechanism of Causation of Class II. is an interesting subject, but I have time to make only slight reference to it. Possibly some cases are congenital or become post-normal very early in life. Certainly a large number of infants at birth appear to belong to Class II. It has been shown that a post-normality of the mandible commonly occurs in the temporary dentition, but these early cases frequently escape observation. Undoubtedly the condition is an acquired one in a large proportion of cases. How is it caused? Most frequently it co-exists with obstructed nasal respiration, and the usual explanation is that the dragging action of the hyoid muscle in oral respiration ultimately drags the mandible into the post-normal position. I think a more simple and probable explanation is this. As a result of the nasal obstruction the maxillary arch does not develop laterally, or only partially so. The width of the lower arch is not primarily affected, and so it is unable to articulate with the upper one, with comfort to the child. Consequently, little by little, the position of greatest convenience is taken up by the mandible, and it gradually gets into the post-normal position in which a narrower part of the mandibular arch can successfully articulate with the narrow upper one. The occlusion of the first permanent molars at the time of their eruption is probably an important determining factor. If at this date there is no post-normality of the mandible, these teeth will probably lock in correct occlusion, and I doubt whether nasal obstruction of later occurrence would cause a post-normality of the mandible. If, on

the contrary, the mandible is already partially post-normal at this date, a position of greater convenience may be gradually taken up, resulting in a complete post-normality. Again, if the mandible is already completely post-normal at this date, the eruption of the molar teeth in locked post-normal occlusion will keep it in this position the more effectively.

The case shown (fig. 2) illustrates this theory. The models are those of a girl *æt.* $4\frac{1}{4}$ years. The upper arch has contracted (or is in a position of arrested development), and the width, measured at the lingual surface of the canine teeth, is 20 mm. The width of the lower arch, measured at the labial surfaces of the canines, is 25 mm., rendering a normal occlusion of the arches impossible.

It appears rational, therefore, to suggest that the narrowing of the upper arch has gradually forced the mandible into a position of convenience, in this case, one of complete post-normality.

The following case (fig. 3) also illustrates this theory (the adoption of the position of greatest convenience). The models are those of a boy *æt.* 12, and there is no history or evidence of nasal obstruction. The upper left lateral has a large tubercle—practically a small cusp—in the position of the cingulum. Probably after the eruption of this tooth a normal occlusion of the mandibular arch would have caused severe discomfort in this tooth. Consequently the position of greatest convenience was adopted, the mandible took up the post-normal position, and the maxillary arch narrowed as a result of the altered occlusal strain.

What then is the treatment of Class II. cases ?

The obvious reply is the removal of the cause, the widening of the upper arch when necessary, and the advancement of the mandible, provided the case is treated sufficiently early to give a reasonable hope of success. In other cases the choice usually lies between a symmetrical extraction of an upper pre-molar tooth, or the retraction of all the upper teeth, and I do not doubt that the former treatment will continue to be practised by many clear-thinking men, even at the risk of being charged with mutilation of the beautiful harmony of nature.

Class III. may be defined as that condition in which the mandible is pre-normal more than one-half the width of the anterior cusp of the first upper molar. Actually the condition is an uncommon one, and must not be confounded with Class I., in which the lower first molars are pre-normal, while the corresponding upper ones are normal. The mechanism of causation of most cases is obscure, but the condition is frequently associated with nasal obstruction, and possibly may be attributed to a cause analagous to that suggested for Class II., *viz.*, the adoption of the position of greatest convenience or comfort.

Cases have been reported as the result of persistent habit (*e.g.*, the forward thrust of the mandible occasionally noticed in violin players) and it may be produced artificially by jumping the bite of a Class I. case.

The ideal treatment is the retraction of the mandible ; if this is impossible, probably the most successful is the symmetrical extraction of a lower pre-molar tooth followed by the shortening of the mandibular arch from before backward.

I propose to devote the second part of this paper to the consideration of the factors mentioned at the outset, and the formation of a sub-classification, and of a graphic index. This portion is probably more controversial, but whether I have acted wisely in treating the subject in this manner I shall be content to leave to your decision.

The factors which remain for discussion are those concerning the dental arches and those concerning the teeth, considered as separate entities. A fourth is also added, which occupies the position of a useful, but necessary appendix.

It may, with reason, be stated that the dental arches should not be considered in separation from the maxillæ. In any case it will be understood that for convenience certain manifestations of variations in the jaws may best be considered under this heading, although such manifestations in the arches may be secondary to those occurring in the jaws.

Factors concerning

II. The Dental Arches.

Factors occurring in one or both arches or unilaterally, associated with three kinds of variation, *viz.* :—

(a) Arrested or incomplete development.
(b) Overgrowth.
(c) Translation.

in three directions, *viz.* :

V 1. Lateral
W 2. Antero-posterior
X 3. Vertical

Y III. The Teeth (considered as units and not including any above variations).

Z IV. Other Lesions.

It will be seen that I have divided the above into five groups, *viz.*, V, W, X, Y, Z.

The groups V and W I shall leave for the present, and use the remaining three as a basis for a sub-classification, naming them (for simplicity) Classes X, Y and Z. This creation of three additional classes, although apparently complicating a classification, in reality considerably simplifies it, as it eliminates three groups of factors which do not occur in a large proportion of cases, and in the cases of X and Z expresses conditions which otherwise hamper simple classification, and yet must have a place if the classification is a complete one.

Class X.

Includes those irregularities which are the result of arrested development or overgrowth, and the manifestations of which are variations in the vertical proportions of the dental arches. It embraces those malformations usually associated with variations in the angle of the mandible, and although it may exist as a general increase or decrease in the depth of the bite, it is usually those variations which occur in either the anterior or posterior portions of the arches that excite attention.

These are :—

(a) Anterior open bite.
(b) ,, close bite (excessive overbite).
(c) Posterior open bite.
(d) ,, close bite.

any of which may be either actual (*e.g.* (a) as a result of lack of premaxillary development) or relative (*e.g.*, (b) as a result of the position of the mandible in Class II. cases, and the consequent alteration of incidence of the anatomical curves).

Further, the condition may arise primarily in the position of the teeth, or in the development of the alveolar processes.

There is scope in Class X itself for a long paper, but I have nothing to add to what is already common knowledge. It is interesting to notice in passing that, clinically, one or other of its varieties is a common accompaniment of Class II. and Class III. Cases. Its occurrence may be expressed thus : Class II. X, or, if it is the sole factor of an irregularity (in which case it must be in Class I.), simply as Class X.

Class Y.

Includes all irregularities of the teeth (considered as units) where such an irregularity is not a result of any of the factors which have been already discussed, or of those arising in Class Z.

These irregularities may be tabulated as follows :—

Irregularities of

(a) Number—
    1. Too many (supplemental or supernumerary).
    2. Too few (congenital or as a result of extraction).
(b) Size and shape—
    1. Too large.
    2. Too small (spaced in normal arches).
    3. Disproportionate in jaws.
    4. Abnormalities of shape (*e.g.*, wide lower second pre-molars).
(c) Position—
    1. Simple displacement (*e.g.*, as a result of retained temporary tooth).
    2. Other malpositions (*e.g.*, impacted third molar or " wandering " canine).

It will be noted from the above table that Class Y includes those cases where one or more teeth are absent as the result of extraction, and so gives a convenient and logical solution to the usual difficulty of classifying them. It also introduces the much discussed subject of the variation in the size of the teeth in proportion to the size of the jaws. Probably no statement in Orthodontics has had more unmerited ridicule than that the teeth may be too large for the jaws, and for the individual. I regret that there is not sufficient time to discuss this point here, but the converse condition (the teeth too small for normal jaws) is not of great rarity, although one would not expect to find it, since the development of the alveolar is so greatly subservient to the teeth. Fig. 4 illustrates this condition.

Inasmuch as Class Y may occur as the sole factor of an irregularity (in which case it must be in Class I.) or as an additional

factor in a complex case the condition may be represented thus: Class I. Y, or simply Class Y. Class II. XY.

Class Z.

Includes those irregularities which are not the result of any condition hitherto mentioned. These are such lesions as cleft palate, trauma, or abnormal frænum labii.

The groups V and W,

it will be remembered, include three kinds of variations in the lateral and antero-posterior sense, any of which may occur unilaterally, or in one arch only.

I have postponed the examination of these because it is necessary to consider them in fuller detail, and because it is from them that I wish to construct a graphic index which shall indicate in general outline the factors of causation, and consequently the ideal treatment of cases to which it may be applied. Further, I believe that probably 90 per cent. of cases in practice—excluding those in which permanent teeth have been lost—will be found to belong to one or other (or both) of these groups, and it is interesting to note that they have largely a common etiological basis. Actually they are usually caused by

(a) Obstructed nasal respiration.
(b) Premature loss of temporary teeth or approximal caries.
(c) Insufficient mastication,

other causes being a variation occurring secondarily in one arch as a result of abnormality in the other, and such causes as thumb-sucking, etc.

A narrowed arch—the common type of Group V.—may be due to any of the above three causes, while a shortening or lenthening of the arch—the common examples of Group W—is usually caused (b) or (c) or by (a) respectively.

The arch of normal width and the lateral variations may be indicated graphically by the symbols

(a) The Normal—

Maxillary, ∩
Mandibular, ∪

(b) Incomplete or arrested lateral development—

Maxillary, ∧
Mandibular ∨

(c) Overgrowth—

Maxillary, ⊓
Mandibular, ⊔

Unilateral variations may be shown thus—

Maxillary, ⌐\ or /¬
Mandibular \⌋ or ⌊/

From the above illustrations it will be seen that only the kind of variation is shown, and it seems inadvisable to complicate the subject by attempting to include the degree of such abnormality.

(A lateral translation of the arch might also be represented by a combination of the symbols for (b) and (c), although such representation would not be strictly accurate.)

The variations included in group W are lengthening and shortening of the arch, as well as translation of the arch in the antero-posterior direction, and inasmuch as the first two of these, either alone or frequently in combination with the third factor, are of common and important occurrence, the necessity for a system of exact measurements is of primary importance.

Since proportions of the normal dental arch have already been fully discussed by this Society, I will, therefore, for the purposes of this paper, confine myself to the statement that, when the width of the arch is not abnormal, the normal length may be understood as the sum of the antero-posterior diameter of the teeth—measured at the widest part of the crown—from the mesial surface of the central incisor to the middle point of the anterior surface of the first permanent molar of the same side in the permanent dentition, and in the temporary or mixed dentitions a corresponding measurement plus the sum of the spaces that should exist between the teeth.*

The consideration of the translation of the arch, or of a part of it, renders it essential to have fixed points for measurement, and undoubtedly these should be the first permanent molars in each arch. Not only are they the teeth least subject to alteration in antero-posterior position, but they are usually the first of the permanent teeth to make their appearance, so that the position of the remainder of the teeth is in great measure determined by this event. They are more constantly present than any other teeth at the usual time of treatment of cases of irregularity, and a consideration of their position as a factor in scientific treatment is of primary importance.

But, inasmuch as these teeth are very frequently in wrong position, any system of classification which ignores this fact and takes their actual position as necessarily correct is at once unreliable and illogical.

I take it that a post-normality of the first molar, except as a result of ill-advised treatment, does not occur, and it is only the pre-normal position that we have to consider. This, I believe, may arise in two different ways, *viz.*, through lack of spacing of the temporary teeth, or through premature loss of temporary teeth, associated with the forward migration of the permanent molars.

In the case in which there is no spacing of the temporary teeth, and possibly even crowding of these, the condition might conceivably arise in two ways, *viz.*, by the obliteration of spaces which had existed at the eruption of the temporary teeth by the crowding forward of the temporary molars and the unerupted first molars, or by the absence of distal movement of the temporary canine and molar teeth at the time it should occur. In either case, the practical result is the same, the first permanent molar takes a posi-

---

* The measurement proposed by Campion, *viz.*, an oblique measurement from the mesial extremity of the cutting edge of the central incisor to the centre of the distal margin of the masticating surface of the first molar on the same side, is probably a better one. For present convenience only I adopt the other.

tion in contact with the second temporary one in a considerably shortened arch, this shortening being from before backwards.

As a result of the unnatural feeding of infants, this condition, of which fig. 5A is an illustration, is common. The actual length of the mandibular arch is 33 mms., and the sum of the antero-posterior diameters of the teeth, plus the spaces that should exist between them, is at least 41 mms., giving a difference of 8 mms. It would appear, therefore, that the first molar is pre-normal to this extent, but some account must be taken of the absence of lateral development of the arch, which would probably reduce this pre-normality to 4-6 mms., and it is important to notice that this is greater than one-half of the width of the anterior cusp of the upper first permanent molar, this being $5\frac{1}{2}$ mms. (fig. 5B).

The only other explanation possible is a lack of growth from behind forwards, but this is in contradiction of all known facts, as antero-posterior growth in the jaws takes place in the backward, and in some extent in a lateral direction only.

Consider then the treatment of this case. Is it suggested to move the first permanent molars distally a distance of 4-6 mms. in addition to expanding the arches ? If not, it is obvious that the placing of all the successional teeth in alignment, or apparently correct position in front of them, although resulting in so-called " normal occlusion," must inevitably produce that most undesirable deformity known as double protrusion, with a corresponding absence of all harmony in the dento-facial area.

Premature loss of temporary teeth, or interproximal caries, may cause a molar pre-normality in one or both jaws, and this condition may be unilateral. But an error in measurement may easily arise here from insufficient consideration of the possible migration backward of the teeth anterior to the first molars. Let us take the maxillary arch first.

The common result of a symmetrical molar pre-normality is a shortening of the maxillary arch, but sometimes the arch i not shortened, and a true superior protrusion is the result.

The following cases show some different results of molar pre-normality, the mandible in each case being in normal position (Class I.). In Angle's classification they belong to Class II.

Fig. 6 shows the 2nd pre-molar erupting in the palate (a pre-molar has been extracted on the right side).
Fig. 7 shows the canine teeth in bad position.
Fig. 8 shows incisor teeth misplaced.
Fig. 9 illustrates a true superior protrusion.

The mechanism of causation of the three first cases requires no explanation, but in the fourth it is not quite so obvious. The models are those of a boy, *æt.* 11 years, with no history of nasal obstruction, but a definite history of thumb-sucking. The arch is only slightly contracted, but the outward movement of the incisor teeth has allowed the forward migration of the teeth posterior to them, including the first permanent molars.

The treatment of any of these four cases by the advancement of the mandible would result in a double protrusion.

Fig. 10 shows a similar condition unilaterally, and its demonstration is more simple.

In the mandibular arch pre-normality of the first molars from premature loss of temporary teeth is less common, and I do not suggest a reason for this difference in the arches. In the lower arch the shortening nearly always takes place from before backwards, the lower first molars usually only moving forward (if at all), until they are locked in occlusion with the upper ones. When the upper ones are free to move, a mesial movement of all may take place at the same time.

Such forward migration of the first lower molars does undoubtedly occur in some cases. Fig. 11 shows a case in which they have both done so, and the case belongs to Class II. The models are those of the child shown in fig. 1, and a reference to the profile at once establishes the class to which the case belongs.

The next cases show the distal movement of the anterior teeth (the more common condition in the lower arch), and incidentally illustrate the retentive power of a locked molar occlusion.

In fig. 12 the left second pre-molar has not erupted. In the other case (fig. 13) an upper pre-molar has been extracted.

The possibility of pre-normality of one or more first molars being then established, it is essential that provision in a complete classification should be made for this condition.

The degree of such pre-normality should also be noted, but inasmuch as it is impossible graphically to indicate different degrees in a simple manner, I suggest that, for the purposes of classification, the standard of measurement should be one half of the width of the anterior cusp of the first upper molar, and that movement equal to, or greater than this measurement shall be termed a pre-normality, and less movement shall be disregarded. A graphic index may then be constructed which will show, by the use of one or two letters, all the possible combinations of position (there are over forty) of the four first molar teeth.

Let N represent the normal position of the first molar
,, +N ,, the pre-normal ,, ,, ,,

Then these four primary combinations are possible, which may be named A, B, C, and D.

| A | B | C | D |
|---|---|---|---|
| $\frac{N \mid N}{N \mid N}$ | $\frac{+N \mid +N}{+N \mid +N}$ | $\frac{+N \mid +N}{N \mid N}$ | $\frac{N \mid N}{+N \mid +N}$ |

For any of the above conditions the use of one letter only is necessary. For all other combinations the use of two letters is necessary and sufficient, the first letter used representing the condition on the right side (in the mouth), and the second letter the condition on the left side.

For example :—

$$AC = \frac{N \mid +N}{N \mid N} \qquad DB = \frac{N \mid +N}{+N \mid +N} \qquad BA = \frac{+N \mid N}{+N \mid N}$$

Further, these symbols may be used in conjunction with the three primary classes, and a tabular representation of this is interesting :—

| | A | B | C | D |
|---|---|---|---|---|
| Class I. | $\frac{N \mid N}{N \mid N}$ | $\frac{+N \mid +N}{+N \mid +N}$ | $\frac{+N \mid +N}{N \mid N}$ | $\frac{N \mid N}{+N \mid +N}$ |
| Class II. | $\frac{N \mid N}{N \mid N}$ | $\frac{+N \mid +N}{+N \mid +N}$ | $\frac{+N \mid +N}{N \mid N}$ | $\frac{N \mid N}{+N \mid +N}$ |
| Class III. | $\frac{N \mid N}{N \mid N}$ | $\frac{+N \mid +N}{+N \mid +N}$ | $\frac{+N \mid +N}{N \mid N}$ | $\frac{N \mid N}{+N \mid +N}$ |

and from this it is at once seen that

I. A, II. D, and III. C, belong to Angle's Class I.
II. A and I. C ,, ,, Class II.
III. A and I. D ,, ,, Class III.

One other factor remains for classification—an actual lengthening or shortening, which may occur in either arch, or unilaterally. If the arch is not crumpled, *i.e.*, if no teeth are rotated or out of alignment, the length of the arch is indirectly proportional to the width. But inasmuch as these two conditions (lengthening and shortening) produce types of irregularity of great dissimilarity, a classification should indicate which condition is present.

Probably the simplest method of differentiation is to name two divisions for these conditions,

Division I. indicating that the arch is lengthened, and
Division II. ,, ,, shortened.

If the same condition exists in both arches it may be described simply as Div. I. or Div. II., but if dissimilar conditions exist it may be shown thus :

$$\frac{\text{Div. I.}}{\text{Div. II.}}$$

If one arch is of normal length and the other abnormal, the condition may be shown thus :

$$\frac{\quad}{\text{Div. II.}}$$

Cases in which the conditions are unilateral may be described thus :

$$\frac{\text{Div. I.} \mid \text{Div II.}}{\text{Div. II.}}$$

In conclusion it must briefly be shown how the methods of classification suggested in this paper may be applied practically.

Possibly it will be thought that the system is too complicated, but classification necessarily includes the consideration of so many factors that extreme simplicity is impossible, and an accurate diagnosis is undoubtedly of primary importance before treatment is commenced.

A list of those factors suggested may be given here, and it will be remembered that each one has a definite meaning.

Classes I., II., and III.
Classes X, Y, and Z.

The Symbols ∧ ∨ ⊓ ⊔
A, B, C, and D.
Divs. I. and II.

The classification of these cases (figs. 11, 14, 9) is then as follows–

Fig. 11. Class I. XC $\frac{\text{Div. I.}}{\text{Div. II.}}$

Fig. 14. Class II. X ∧V Div. I.

Fig. 9. Class I. X VC $\frac{\text{Div. I.}}{\text{Div. II.}}$

It is noted that the omission of any sub-class or symbol connotes the absence (or normality) of the corresponding factor in the irregularity.

Finally, I must express my indebtedness to Dr. Sim Wallace for allowing me to refer to some of his writings. I believe that these cannot fail to produce a profound influence on the science and practice of Orthodontics.

My thanks are also due to Mr. J. W. Doherty for the production of the lantern slides and illustrations shown.

---

## Discussion.

Dr. J. Sim Wallace said that when he promised to open the discussion he had no idea that Mr. Spiller was going on lines so generally satisfactory to his own way of thinking, and therefore he had no adverse criticism to make. On first reading the paper it appeared to be a highly complex one, and possibly Mr. Spiller might have been able to simplify it. One of the greatest objections to many previous classifications was that they simply were not classifications; they shirked the difficulties of ordinary irregularities and made a small set of irregularities suit the classification. He thought Mr. Spiller had made an honest attempt to classify irregularities of the teeth. He quite agreed that in considering any question of classification the jaws, the dental arches, and the individual teeth had to be taken into consideration. With regard to the dental arches, he was inclined to classify all Angle's classifications by adopting Mr. Northcroft's words "pre-normal" and "post-normal," because he thought those descriptions covered pretty satisfactorily a great deal of ground and were extremely simple. With regard to individual teeth, he thought it would be sufficient simply to mention in a descriptive way the particular irregularity, lingual occlusion, buccal occlusion, rotation, etc. One objection he had to Mr. Spiller's paper was that there were too many classes and divisions, and too much of the *x* and *n*. Such things were very difficult to follow and if it were possible to get words fairly descriptive he thought it would do away with a good deal of difficulty. Any decent classification of the irregularities of the teeth naturally involved a considerable amount of complexity, but possibly Mr. Spiller could simplify the matter by having three separate classifications that could be combined. There might be a classification for the jaws, such as prenormal, post-normal and normal; a classification for the occlusion, rather than the

dental arches, because it was extremely useful to have a classification of occlusions pure and simple, especially for models ; and thirdly, a descriptive classification of the teeth. With regard to the jaws, of course, over and above the antero-posterior classification there was also required a lateral and a vertical. With reference to the statement in the paper as to something which seemed to be directly in conflict with something he had said before, he did not think the statement was a rash one at all. He was inclined to agree with what Mr. Spiller said, that it was possible in a general way to take the superior maxilla as usually normal in position. The abnormality that gave trouble in the upper maxilla was that it was almost always arrested in development, but he doubted very much whether it was displaced. Therefore if he had said that before he would take it all back.

Mr. M. Hopson said Mr. Spiller had in a measure disarmed criticism because towards the end of his paper he pointed out that any classification of dento-facial irregularities must necessarily be somewhat complex, and he entirely agreed with him. Those who aimed at a simple classification of dental irregularities in his opinion were aiming at the moon, and their shot would not reach above the cross on St. Paul's. When a student, working for his earliest examination, his old teacher gave him as a classification of dental irregularities the following :— Number, size, shape, position, the jaws participating and the jaws not participating. It seemed to him Mr. Spiller had arrived at very much the same conclusions ; he had elaborated those particular points and had laid stress upon the part the jaws played as apart from the teeth. He had taken the teeth together, collectively and as separate entities and had endeavoured to make groups of those various factors and co-ordinate them, and he thought he had succeeded. There were one or two little points in the paper he did not quite grasp, probably printers' errors. When Mr. Spiller spoke about the causation of some Class II. cases, where there was post-normal occlusion, he suggested that those cases might possibly result from the jaw taking up the position of the greatest convenience. It was a little difficult to follow him there, because it was well known that when the teeth were at rest in occlusion it was extremely difficult to bring them back voluntarily to any extent behind at rest in occlusion ; it was certainly far more easy to advance the mandible and put the teeth and the lower arch in pre-normal occlusion. It appeared to him that arguing on those lines one would expect to find a very much larger percentage of cases of pre-normal occlusion than was really found, and a smaller percentage of cases of post-normal occlusion. Mr. Spiller had given much more attention to the subject than he had, and it would be interesting to hear what he had to say upon those particular points. Mr. Spiller had undertaken a very big piece of work and rendered the dental profession his debtors. He had grouped together the various irregularities and had emphasized points which those who had attempted the same work had overlooked or slurred over or passed by. The paper was not so complicated as it appeared at first sight, and he wished to thank Mr. Spiller for an excellent piece of work, a method of graphically and easily recording in a sort of dental shorthand the various points in connection with the subject.

Mr. George Northcroft said any criticism he had to offer on the paper would, he was sure, be attributed to the keen desire he had to obtain the best for the Society and the profession. In the first place, he thought it was difficult to follow the differences between the jaws (Section I.) and the dental arches (Section II.), and in writing further on the subject he should suggest the employment of more distinctive means. Section IV. was probably omitted owing to a printers' error.

With regard to Section I. (a), it was more than likely that the maxilla might be often really post-normal to its true position owing to non-development of the antrum, etc. He did not think Mr. Spiller meant that the antero-posterior position of the maxilla of normal shape varied in relation to the cranium according to the race, etc., but that it remained relatively in the same position even in crania of different shape. Was not the prognathous maxilla of the negro dependent on the alveolar arches, and not on the relation of the maxilla to the sphenoid and other bones of the cranium ? He should like Mr. Spiller to state a case illustrating the proposition put forward when he said : " It is, however, possible for the maxillary arch to be pre-normal in a maxilla of normal antero-posterior relations, except in so far as the alveolar portion of the anterior part of the jaw is concerned. This is not a true displacement of the jaw and is considered later." He thought it was extremely unfortunate that any classification should use the figures adopted by Angle, especially when they meant nearly the same thing. Class L.B.V. would do just as well. Referring to the frequency of the wrong position of maxillary molars, it might be remembered that some cases were shown in February, 1910, before the Society, illustrating cases simulating Angle's Class II., which were really cases of pre-normal maxillary molars ; but only pre-normal at *that* time, as it was due to the upper molar taking up its normal position too soon, with apparent delay in development in the front of the mouth. Writing in 1907, he said " In development the first upper molar starts behind and within the molar process, gradually coming forwards and downwards till the process blends with the ridge formed by the anterior buccal root ; this tooth practically occupying the position once held by the second deciduous molar." If one took the molar process as a fixed point relatively to the alveolar arch, that fixed point only varying with the growth of the skull, it would be found that the first upper molar actually travelled through that bone and gave rise to the very definite impression that Angle was roughly right in his contention that the first upper molar was always normal. It seemed a pity Mr. Spiller should have quoted Dr. Sim Wallace at such length on the determination of the true position of the molars, as those statements were certainly of the vaguest and could not help in greatly simplifying that determination. Surely Mr. Spiller's statement that " The whole upper arch may be pre-normal and so give rise to true superior protrusion," should come in the discussion of Section II. and not under the relative position of the jaws, Section I. He should be glad to know where Mr. Spiller placed Angle's Class II., division 2, and what number of models he examined to work out the averages of 52 per cent. pre-normal and 48 per cent. post-normal molars, and how many of those post-normal cases were division 2. Mr. Spiller did not take into consideration that blessed word " reciprocal " in his little jeer at the *soi-disant* apostles of facial harmony, and it was probably by a just appreciation of that method that the most harmonious results were obtained. In 1907, he himself pointed out the marked effect of temporary canines in producing post-normal occlusion, " A feeling of discomfort is experienced, and the child endeavours to make a more satisfactory adjustment ; the lower canine is slipped behind the upper, the first permanent molars are beginning to come through, and, in adjusting themselves to the new position, are locked, and distal occlusion is established." The position of greatest convenience was a sound proposition, but one ought to go further still ; just as much as the order of eruption of the permanent teeth was so important in affecting regularity, so was the order of eruption of the temporary teeth, and it was undoubtedly in departures from the normal in that respect that irregularities most frequently occurred. At present very

little was known about the child's dentition before it was two years old. He was more than ever of the opinion that the ideal treatment for Angle, Class I., Division 1, was not extraction, but in Class I., Division 2, it might still be the best treatment. With regard to the dental arches, he should like to know where section (*c*), "Translation," came as a factor into "X," the vertical abnormalities of the arches. It would have saved confusion had the italic letters, (*a*) (*b*), (*c*), used for the variations of Section II. been repeated in the graphic index, and the normal placed under some other letter. The measurement of the mixed dentition, plus the sum of the spaces that should be there, was really more complicated and more open to error than the use of the Hawley arch, which had been proved to be founded on a fallacy. It was well recognised, for instance, that the sum of the widths of the temporary molars was greater than that of the pre-molars, and until those erupt must remain an unknown quantity. Was there any proof of the distal movement of the temporary canine taking place normally ? Owing to a printers' error the mandibular arch was spoken of as 33 mm. long, but that, of course, should be half the mandibular arch. If N represented the normal position of the first molar, + N represented the pre-normal position of the first molar, why should not—N represent the post-normal position of the first molar. ?

Mr. SPILLER said it certainly could.

Mr. NORTHCROFT said that time alone could show if the use of a graphic index was desirable and not too complicated ; at any rate, Mr. Spiller was to be very heartily congratulated on an honest endeavour to work out a most complicated subject with a progressive and illuminating spirit.

On the proposition of Mr. MELLERSH, seconded by Mr. NORTHCROFT, the discussion on the paper was adjourned until December 13th.

# The British Society for the Study of Orthodontics.

## ORDINARY MEETING.

An ordinary meeting of the Society was held in the rooms of the Medical Society of London, 11, Chandos Street, W., on Wednesday, May 10th, 1911, Mr. W. Rushton (President) in the chair.

A Paper was read by Mr. J. H. Badcock on

## The Screw Expansion Plate.

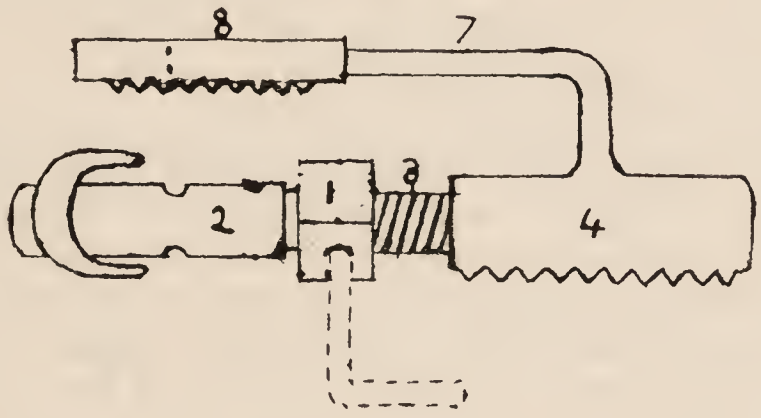
From time to time I receive enquiries as to the construction and use of the screw expansion plate which I employ, and this encourages me to hope that a detailed description of it may be of some interest to the members of this Society.

The apparatus consists of a vulcanite plate held in position by "cribs" and divided in the median line into two halves capable of separation by a screw: with the addition of a flexible wire arch, should it be desired to effect retraction of the anterior teeth as well as lateral expansion.

The cribs and arch are made of platinized gold wire.

The screw device consists of a wire with a square boss (1) in the middle of it. One end is smooth and revolves stiffly in a tube (2), the other is threaded (3) and screws into a tube or elongated nut (4) roughened for the purpose of holding in the vulcanite.

Also soldered to the tube is a parallel wire (7) sliding in a sleeve (8) roughened to hold in the vulcanite. This gives added rigidity to the apparatus and prevents rotation of the halves when an arch is not used. Fixed to one side of the square boss (1) is a wire tag (9) to be embedded in the plaster when flasking and hold the device in position during packing. It serves no further purpose and is cut off after vulcanization.




The plate is made as follows, *viz.*:—

The gum margin around the buccal sides of the teeth selected for "cribbing" is carefully pared on the plaster model for about $\frac{1}{32}$ in., so as to reproduce the shape of that part of the tooth immediately beneath, and the retiring angle between tooth and gum on the lingual aspect slightly deepened with a sharp point round all the teeth with which the plate is to be in contact.

The most satisfactory teeth to " crib " are the temporary molars, because of the well-defined ridge in which the enamel terminates on the buccal side.

If the choice between first and second is open, that should be chosen which is most nearly equidistant from the front and the back of the plate.

In fitting the cribs special care is needed not to rub the model at the point where the wire passes over the contact point of two teeth, or the plate will not go home in the mouth. The bend here should be square rather than round.

The cribs being finished, the arch, if one is to be used, is now fitted.

It is flattened from canine to canine and is provided on either side with a U-shaped upward loop in the premolar region to permit of subsequent adjustments. These loops must not be made to lie too close to the gum, or they will be a source of trouble when the alveolus widens to accommodate the advancing premolars.

It is also provided with a hook to pass under the cutting edge of one of the centrals, or one may be fitted for each central, to prevent the arch from slipping up towards the gum when strain is put upon it.

The arch is soldered to a " crib " at either end, and this may be done at this stage or after vulcanization, the vulcanite being kept cool with wet sand during the process.

The cribs having been placed in position the plate is waxed up, dripping on to the oiled model.

Before setting the screw the square boss should be carefully enveloped in plaster or much time will be wasted later in clearing the working parts of vulcanite.

This done, it is placed in position with the wire tag uppermost.

It should be placed as high in the palate as possible, or in the lower jaw as far forward as it can be got, and in the upper jaw as nearly as may be in the middle of the palate, *i.e.*, equidistant between front and back, the parallel bar lying forward and as flat as possible.

Before opening the flask it must be well warmed. On withdrawing the lid the screw will be seen attached to it.

Packing must be done with care, and wet rag used as a parting medium until the final closing.

After vulcanization the tag on the screw is removed.

The margins of the plate should present a knife edge where they impinge on the necks of the teeth to prevent slipping.

It is well to scratch an arrow on the vulcanite by the side of the screw to indicate the direction in which it should be turned.

When adjusting the plate to the mouth, tighten the cribs until it goes in with a click. If they fit there will be a little blanching of the gums, and for the first twenty-four hours there may be slight soreness of the supporting teeth, but this passes off very quickly.

The child should be seen again in the course of a day or two, when the plate will have settled down fully into place and the cribs may need a little more tightening. At this visit the key and full instructions as to the use of the plate should be given to the patient.

It must be worn day and night and at meal-times. After each meal it must be removed, brushed with soap and tooth-powder, and at once replaced, the teeth being also brushed.

Twice a week the screw must be given half a turn in the direction of the arrow.

To make mistake impossible it is my custom to mark two opposite sides of the square boss with a spot each. One spot being uppermost the child has to turn the screw until the other takes its place. Expansion is thus gained at the rate of one thread of the screw per week. At this rate it is effected without any pain or discomfort, and the amount of increase in width at any one time is so slight as not to prevent the plate from easily going home into its place. It is essential that the plate should hold in firmly, so firmly that it is removed with some difficulty and cannot possibly be dislodged by the tongue.

Having decided the amount of expansion required, measure it off on the screw before the plate is made, or afterwards on a similar screw. The number of threads included gives the number of weeks during which the patient is to continue tightening the screw.

The convenience of this particular form of plate is that the patient may be sent away for any length of time with the certainty, barring accident, of his returning with the desired result accomplished, provided that he has carried out instructions.

---

## Discussion.

Mr. Rowlett asked Mr. Badcock whether he had found that the cribs, when fitted between a molar and a bicuspid, tended, after some time, to cause considerable separation between the two teeth, *i.e.*, supposing a crib was fitting over the molar there would be considerable separation between the second bicuspid and the first molar.

Mr. H. Baldwin thought the Society was much indebted to Mr. Badcock for bringing forward what was, as far as he knew, a new screw. In his own practice he had been using the original form of double-acting screw, and it had done some good work, but there had been some difficulty with it in connection with loosening of the screw. He had no doubt that the new screw was an improvement. The great advantage, to his mind, of any screw apparatus was that it was more rigid than a spring plate. The difficulty in nearly all cases of plates for young patients was of obtaining fixity of the plate, and the weakness of the spring plate was its pliability. With regard to the cribs, they certainly held exceedingly well and he did not think it was possible to do without them, but they tended to shorten the teeth, not only the teeth they were attached to, but sometimes the teeth at each side of them as well, and that was a thing it was very desirable to avoid. The object often was to get the back teeth to grow as long as possible, and the front teeth, the lower front teeth especially, to get shorter. He should like to know whether Mr. Badcock usually took his impressions for regulation cases with plaster of Paris or composition. As a rule he took his own impressions with composition in regulation cases, and he found he obtained the best results by not having the whole of the composition in the tray soft, but the deeper layers very hard. The composition was placed in the tray in layers and pressed down very firmly, and allowed really to get almost cold, so that the only layer which was really soft and hot was the last layer, which was comparatively thin. Before putting it into the mouth he cooled

the back of the tray with cold water and vaselined the surface of the composition, so as to prevent it sticking to the teeth. Then the composition was just heated on the surface in a Bunsen flame. It required considerable pressure to obtain the impression, but the fit obtained in that way was exceedingly good.

Mr. HEDLEY VISICK asked whether Mr. Badcock had experienced any trouble through the mucous membrane of the palate becoming inflamed under the plates, especially in cases where an arch had been worn round the front teeth while the upper arch was being expanded. The plate of necessity had to be cut away behind the upper incisors to allow them to be retracted, and in his own experience he found that the gum appeared to be pinched between the front edge of the plate and the lingual side of the incisors. He should like to know if there was anything to prevent that.

The PRESIDENT asked whether Mr. Badcock made it an invariable rule for his patients to wear their plates during meals, because that was the time when the greatest pressure was exerted on the cribs, and it seemed to him that, in certain cases at all events, it was a wise plan to allow the child to remove the plate during meals.

Mr. BLAABERG said he had invented his tongue-shield for expansion screw with a similar object to that for which Mr. Badcock had developed his apparatus, with the idea of making a more comfortable plate and maintaining a parallel.

Mr. PREEDY said he had been so fortunate as to have half-a-dozen successful cases with Mr. Badcock's screw appliance, and he had not found it necessary to use a crib in any case.

Mr. SPILLER said it really seemed as if expansion by appliances was becoming too easy in a way, because it distracted attention from the natural expansive growth of the arches. There was no doubt that expansion was quite possible at an early age if sufficient attention was paid to the diet. He hoped the discussion of all the easy methods would not turn the thoughts of members away from the really correct method of treating cases, which was by providing the child with a proper diet.

The PRESIDENT remarked that the important matter of breathing through the nose was a factor which must not be disregarded.

Mr. SPILLER said in some cases that was of great importance. With regard to apparatus, he made the boss circular with holes in it instead of having a square nut. He found in several cases that the points of the nut had irritated the tongue, and he had to file the points a little. He also wished to know whether Mr. Badcock could give any idea of the proportion the front teeth travelled back to the amount that the arch had expanded. Also he should like Mr. Badcock to give some special instructions as to the making of the crib itself, because it was not an easy thing to do.

Mr. LOCKITT asked how Mr. Badcock got over the difficulty of keeping the bite open when the cribs were put in, in cases where an endeavour was being made to get expansion with the teeth in close contact, and there was considerable difficulty in getting the patients to wear the plates if the cribs had to keep the bite open.

Mr. J. H. BADCOCK, in reply, said he agreed with Mr. Rowlett that cribs had a tendency to separate the teeth, for two reasons. It might be because the crib had in the first instance been fitted rather too closely, sufficient care not having been taken to see that the wire had not been fitted too closely to the plaster model, so that when the plate eventually worked home the cribs tended to get in between the teeth and thrust them apart. He always had his cribs made, if anything, the least bit free of the teeth, so that the plate might bed itself home in the gum, and when that had taken place the crib should be only

in the position it was intended to be in, just bridging across the junction of the teeth, and not pressing between them. If it was made to press too tightly in the first instance, when the plate went thoroughly home there would be separation of the teeth. He also thought in many cases it occurred when used on the permanent teeth simply because of the eruption of the teeth themselves, and in that case it was unavoidable, and the only thing was to make a new plate and new cribs. It was a similar point to that raised by Mr. Baldwin about the shortening of the teeth. In his own practice he did not very often meet with those difficulties, because he generally employed the cribs on temporary teeth. That was not always possible, but where possible he always began expansion while the temporary molars were still in position at about 8 years of age, and if one was able to crib the temporary molars two-thirds of the difficulties vanished at once. He was glad to have Mr. Baldwin's support in his method of taking impressions, because he always took them in composition and in the same way as Mr. Baldwin. Having filled the tray, he polished the surface with vaseline, chilled the back with cold water, and warmed the surface over the flame, and in that way obtained much the same result as Mr. Baldwin obtained. With regard to Mr. Visick's question as to the inflammation of the gum, there were two kinds of inflammation sometimes occurring. One kind arose owing to a dirty plate, the long wearing of a plate that was not kept perfectly clean, and the remedy for that was of course cleanliness. Even then he had been sometimes bothered, especially in the case of lower plates, by getting a certain amount of inflammation under the plate when the plate had been worn for a long time ; but it had never been serious, and in the one or two cases where it had occurred he was not aware that any evil result had followed. As soon as the plate was removed the condition became all right again. With regard to the heaping up of the gum at the back of the teeth and inflammation, that was a condition which arose and for which he had never found any remedy. It seemed to right itself in course of time, and he did not take much notice of it except to cut his plate as far back as possible, and so to avoid its getting pinched between the teeth that were coming back and the anterior edge of the plate. With regard to the President's question as to the patient invariably wearing the plate during meals, he did invariably insist upon that. He quite agreed that in many cases it was advisable not to, but he found that if he allowed the patient to take the plate out before meals he frequently forgot to put it back for many hours afterwards. If he could ensure that the child would take the plate out immediately before meals and put it in immediately afterwards, he would allow him to go without it, but there was such risk of his not doing so that he preferred the minor evils which occurred owing to the plate being worn. He thought they were quite minor evils. It was true the patient suffered a little discomfort from the cause mentioned by Mr. Lockitt, but he very soon got used to it. A child would get used to almost anything, and it did not really matter. With regard to using a circular boss with holes in it, instead of a square nut, as suggested by Mr. Spiller, he thought that was a very good idea, except his experience of such things was that they did not work very well. If it was at all a small thing the tool which fitted into the hole was rather delicate and was apt to get broken or bent by the child, and with frequent use the hole itself was rather apt to get spread, and the boss would be a little difficult to turn. The square nut and the square spanner were things to which nobody could possibly do any harm, however hard they tried. Therefore, in spite of the corners, to which there were objections, he used them. Very frequently he slightly rounded the corners, and then he thought the difficulty of the scratching was overcome. With regard to the proportion of the

backward travel of the front teeth to the expansion of the plate, he really did not know what it was, having never worked it out. It was considerable. If no adjustment was made to the arch, and expansion amounting to something like 3 millimetres was obtained, the backward travel of the teeth was very noticeable. His attention had never been particularly directed to that, because if he found the travel was not quite as fast as he wanted it to be he simply tightened up the little U-shaped loops at the side of the arch, which were put there in order to accelerate the travel if necessary. As to the construction of the crib, beyond that it should be very carefully fitted, so that it really did fit everywhere and the teeth were not rubbed at all, he did not think there was any special point in it. He did not use the little piece of metal which Jackson, the originator of the crib, always used on the inner side. When Jackson made his crib he fitted a little piece of metal along the lingual side of the tooth, the edge of the metal fitting down into the angle made by tooth and gum, and then he bent up his crib and passed the ends of the crib over the piece of metal and united the two. His original plates were always made in metal and the crib and the piece of plate were united by means of molten tin. In using vulcanite plates there was no necessity for the piece of metal on the inside. He took the precaution of deepening the groove on the lingual side to begin with, and the vulcanite held in quite sufficiently tightly and there was no danger of the crib slipping.

In answer to Mr. Preedy, as to why cribs were used at all, he used them simply because he felt very much more certain about the action of the plate if he knew it was always tightly home in its place. If the plate could be flicked out by the child's tongue and played with for half the day, he did not feel it was likely to do anything like as good work as it was if always fixed firmly in place. He liked to feel he knew the result he was going to get, that if he saw the child in the Christmas holidays he knew quite well the condition he was going to find at Easter. If the plate did not fit very firmly he could not be at all sure of the result. He did not gather from Mr. Preedy's remarks whether he had some other means equally efficient of keeping the plate steady, or whether he found that even with a fairly loose plate expansion could be obtained. That was so very often, but he preferred to get the more adequate means of security by means of the crib, especially as he saw no disadvantage whatever in the use of the crib, particularly in temporary teeth.

The following demonstrations also were given :—

"Tongue Shield for Expansion-Screw," by Mr. C. J. Blaaberg.

"Fixed Appliance to Raise the Bite," by Mr. C. J. Blaaberg.

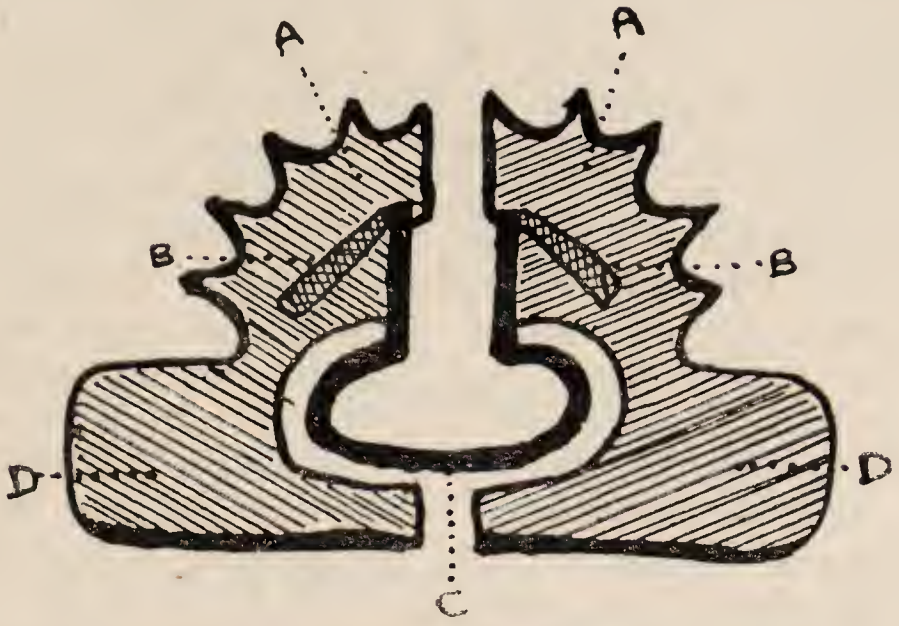
"Results with Expansion Plates," by Mr. J. W. Doherty.

"An Expansion Device for Lower Cases," by Mr. H. C. Highton.
See illustrations page 28, 1910 Transactions Report.

"The Prosopometer and Measurements Made Thereby," by Mr. G. Northcroft.

"The Pullen Band-Forming Pliers," by Mr. G. Paton Pollitt.

"A Modified Coffin-Spring Plate," by Mr. C. Schelling.




A. The two halves of the vulcanite upper plate.
B. Flattened ends of spring embedded in the vulcanite.
C. The piano-wire spring, fitted to the concavity of the palate; by the opening of the circular part of the spring the anterior part of the arch is pressed upon and expanded.
D. Masticating surfaces.

The President having accorded the thanks of the Society to the Demonstrators and those who had taken part in the discussion, and to Dr. Sim Wallace for presenting copies of Journals to the Library, the Society adjourned to October 11th.

## ORDINARY MEETING.

An Ordinary Meeting of the Society was held at the Rooms of the Medical Society of London, Chandos Street, W., on Wednesday, October 11th, 1911, Mr. W. Rushton (President) in the chair.

The Minutes of the last meeting were read and confirmed.

Mr. H. E. Marsh, L.D.S.Eng., D.D.S.Penn., of Bexhill, was balloted for and elected a member of the Society.

The President referred with regret to the death of Mr. Pidgeon and proposed a vote of condolence with his widow, and the motion was carried by the members standing.

Mr. Norman G. Bennett read a communication on

### Rational Terminology in Occlusal Relationship.

I am afraid that what I have to say is not very much. It has reference to some few of the terms constantly in use which seem to me to be wrong or inadequate. Starting with the word "occlusion," which means literally shutting together, it involves the idea of two things, because one thing cannot shut together. The word "occlusion" refers not to a thing itself, but to a relationship. From the word "occlusion" we get "normal occlusion," which means normal relationship. It is clear to most of us what "normal occlusion" means, because we have all of us experienced it for ourselves, or read long descriptions of the exact way in which writers say the teeth ought to meet. For my part I think that sufficient allowance has not been made for what we might call variations within the limits of the normal; it is too much taken for granted that there is one definite ideal occlusion. "Malocclusion" means an occlusion which is incorrect. It may be

incorrect in any particular, but the two particulars I want to refer to now are the incorrectness in antero-posterior relationship, usually designated pre-normal, and post-normal occlusion. Sketch No. 1 is supposed to represent an upper and lower molar in normal occlusion, A being the anterior and P the posterior. Sketch No. 2 is very familiar to us, but there is no name for that condition. Some people may say it is post-normal, but if so is it of both teeth or one tooth ? If post-normal occlusion means anything it means that both teeth are posterior to their normal position, but that is not what is usually meant, and therefore we are obliged to say it is post-normal occlusion of a particular tooth, thus varying the original meaning of the word "occlusion," which refers to relationship and not to a tooth. Before we can say that a tooth is in post-normal occlusion or in pre-normal occlusion we have diagnosed the case. It is true we must have terms to describe the results of our efforts at diagnosis, but I think it is more essential still to have terms to describe what we see before we attempt

No. 1.

No. 2.

to diagnose. The point I emphasize is that in using these terms, "pre-normal" and "post-normal" occlusion, we are diagnosing the case. What we want is a description for the arrangement of teeth which we see quite often, without coming to any conclusion at all as to whether the lower molar is too far back or the upper molar too far forward. I think we know also that in a great number of cases both teeth are displaced with regard to their relationship to other parts. I appeal to the Society to find a name for that condition without presuming to tell which tooth is at fault. It is very easy to invent signs to describe the normal relationship, and the relationship discussed, and the opposite kind which I have not referred to, the condition in which the lower tooth is pre-normal, or the upper post-normal. We can easily signify normal occlusion by a perpendicular line and the other conditions by diagonal lines, but I want a name as well as a symbol.

Normal.

Post-normal lower
or Pre-normal upper.

Pre-normal lower
or Post-normal upper.

In the United States especially, in order to keep the use of the word "occlusion," they refer to torso-occlusion for a tooth being twisted and supra- and infra-occlusion, but it seems to me those terms are a mistake. Obviously when teeth do not meet together they are not in occlusion, and to describe them as being in occlusion, with a prefix to say they are not, is a contradiction in terms. The same argument applies to torso-occlusion, because when a tooth is rotated on its axis it is as a rule not in occlusion at all.

---

## Discussion.

The PRESIDENT thought Mr. Bennett had made out an absolute case, but it would have to be a very ingenious word to describe what was passing in a person's mind.

Dr. SIM WALLACE thought the word "occlusion" was the very word Mr. Bennett was wanting. Occlusion meant the relation of the lower to the upper, and the upper row of teeth had to be located according to the skull or the general lie of the face. One could not look to the upper row or to the lower row except by occlusion. Consequently it was always post-normal or pre-normal. The position of the complete upper arch might be forward or backward, but the relationship of the lower teeth would be pre- or post-normal, independent of the position of the upper teeth, as long as the relation of the lower to the upper was as promised.

Mr. G. NORTHCROFT supported Dr. Sim Wallace and pointed out that the terms post-normal and pre-normal were used to supplant terms which were thought inadequate, "distal" and "mesial." In speaking of distal occlusion the full term, "distal occlusion of the lower jaw," was used, and that left no doubt as to what was meant; but, ordinarily speaking, "distal occlusion" was considered quite sufficient. In the same way "post-normal occlusion" implied post-normal occlusion of the lower jaw. Now the terms "post-normal" and "pre-normal" referred only to the relationship of the occlusion of the teeth themselves, and had nothing whatever to do with the position or relationship of the jaws to one another.

Mr. BENNETT, in reply, thought Dr. Sim Wallace's criticism appeared to meet the case, but did not get over the difficulty. If it were assumed that pre-normal or post-normal occlusion was applied to the lower teeth only then by using the prefix "post" or "pre" the condition was defined, but there was no means of describing the condition when it was the upper teeth which were at fault. It would be better to have a perfectly neutral term to describe the two conditions, a term which did not refer to the upper teeth or the lower. If post-normal relationship referred to the lower teeth, a great many people might think the lower teeth were too far back, when sometimes the upper teeth were too far forward. Therefore, although the term might be correct, it seemed to him to be a term which was open to misconception.

Mr. H. BALDWIN read a paper on

## Notes on Some Cases of Orthodontics.

REFERRING to cases of so-called superior protrusion, when first I entered the field of private practice, twenty-seven years ago, the custom was to examine the models of the case, and it was generally said, "These front teeth are too far forward, there are no spaces behind into which to push them back, consequently, something must be extracted." At that time it was generally the six-year

molar which was considered the right tooth to extract ; in fact, a great many dentists held the opinion that almost everybody would be better with their six-year molars extracted. Very soon after this, Dr. Isaac Davenport, of Paris, drew attention to the great value of the six-year molar, and showed that for many reasons, it was the most valuable tooth in the head. Thereupon we stopped extracting the six-year molars ; still we used to extract something to make room, and it was either the first or second upper bicuspid, preferably the first, because it was nearer the irregularity, and made the regulation easier. A great many of these cases gave fairly good results. Expansion was known, but not very often practised on the lower jaw, though fairly often on the upper. Expansion of the upper jaw was always practised in cases which were considered to be typical cases for expansion, *i.e.*, in which the external cusps of the upper back teeth bit internal to or edge to edge with the corresponding cusps of the lower. The Coffin plate was used, and expansion was proceeded with until the cusps of the upper bicuspids and molars articulated more normally with those of the lowers. Then arose a perfectly new school, the school of expansion in all cases, both upper and lower, and extraction under no possible circumstances. It was said by these that cases of superior protrusion, so-called, being clearly due to impaired nasal breathing, dependent on the presence of adenoids and enlarged tonsils, and not due to a really congenital tendency, if the condition of impaired nasal breathing were cured by removing the adenoids and seeing to the tonsils, there was no reason why the jaws should not be expanded to the full width and all the teeth pushed and pulled into normal position. That was the chief reason for undertaking the expansion of both jaws to the full, so that all the teeth in each arch could be pushed into their proper position. This treatment must generally be preceded by a biting-plate for lower incisors to bite upon. They introduced an entirely new method of treatment, the intermaxillary traction, which exerts a force backwards on all the upper teeth and forwards on all the lower ones, to such an extent that the bite can be practically re-arranged, and a perfect occlusion brought about. Now most of the cases I have brought to-night are nearly all of them shown with the view to arguing upon those premises ; that is to say :— I.—Is it true that these bad cases of so-called protrusion can be perfectly treated by expansion of both arches and reciprocal traction ? II.—Is it true to say that teeth in these cases ought never to be extracted ? I may tell you at once my own opinion is that in a great many cases, in fact the majority of cases, the new school, in their treatment, is absolutely and entirely right, and achieves far better results than the old school ; but on the other hand I believe there are some cases in which the new school is wrong, but wrong only in that they should *combine* their method of treatment with a little extraction. Immediately after the biting-plate has been discontinued, I believe it would often be better to extract the first upper bicuspid in the upper jaw, or the first bicuspid in both upper and lower. To put it definitely, I would say the cases in which we ought to extract something are, 1st, where all the teeth are very large in comparison to the patients' face ; 2nd, where the con-

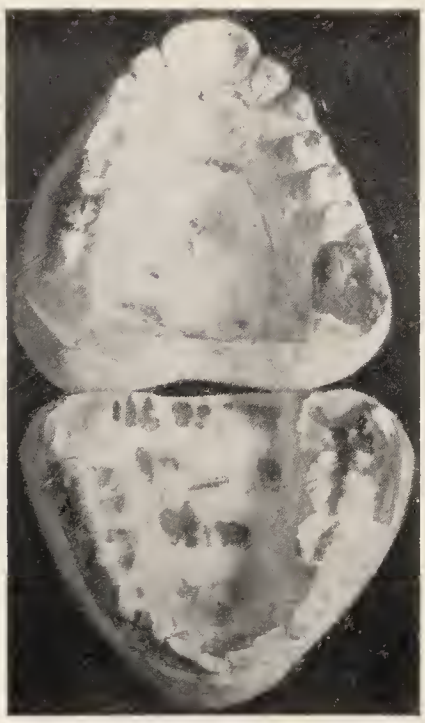
# To Illustrate Mr. Baldwin's Paper.

Case I., No. 1.
Relapsed after treatment.

Case II., No. 2.
Relapsed.

Case I., No. 2.
Relapsed after treatment.

Case IV., No. 1.
Before treatment.



Case II., No. 1.
Before treatment.

Case IV. No. 2.
Before treatment.

# To Illustrate Mr. Baldwin's Paper.

Case IV. No. 3.
After treatment.

Case V. No. 2.
Nearing completion after extractions.

Case IV. No. 4.
After treatment.

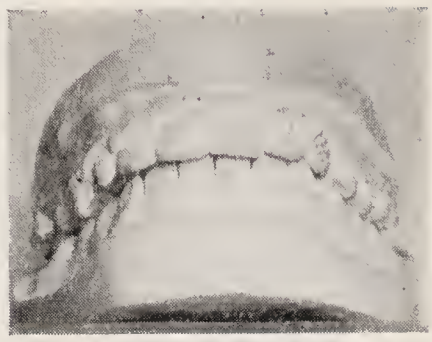
Case VI. No. 1.
Before treatment.

Case V. No. 1.
Immediately after extractions.

Case VI. No. 2.
Before treatment.

# To Illustrate Mr. Baldwin's Paper.

Case VII.
Before treatment.

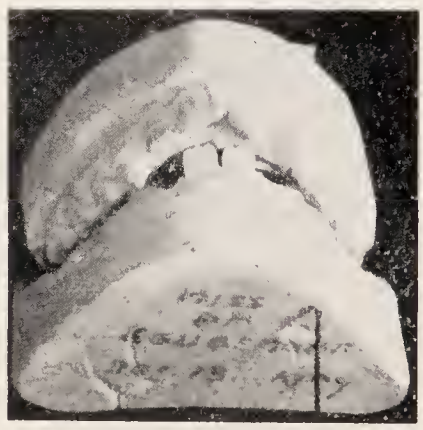


Case VIII. No. 3.
After treatment.

Case VIII. No. 1.
Before treatment.

Case VIII. No. 4
After treatment.

Case VIII. No. 2.
Before treatment.

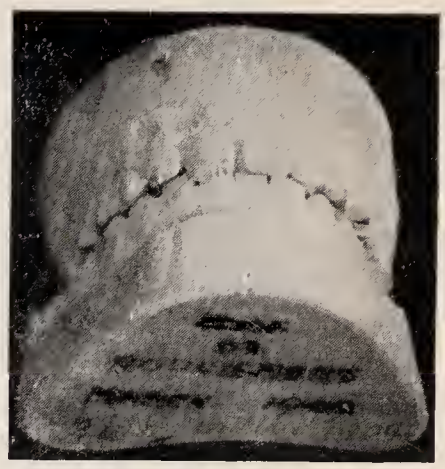


Case IX. No. 1.
Before treatment.

# To Illustrate Mr. Baldwin's Paper.

Case IX. No. 2.
Before Treatment.

Case IX. No. 3.
After Treatment.



Case IX. No. 4.
After Treatment.

Retention Plates.

A

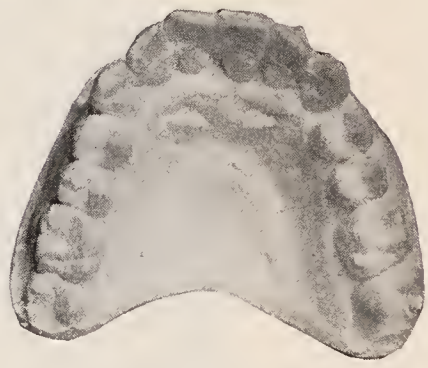
Expansion Plates.

Case IX.
A. The dark band seen is merely the shadow in photograph.

Case XV.
After Treatment.

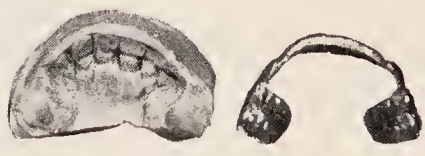
Case XVI. No. 1.
Before Treatment.

Case XVI. No. 2.
After Treatment.



Case XVI. No. 4.
After Treatment.

Teeth grooved ready for wire. →



← Splint which was filled with plaster and put on to hold teeth firm while grooves were being cut.

Case XVI. No. 3.

tracted arch forms a very good arch, all the teeth being in a fairly good position, excepting that one tooth on each side is squeezed right outside that arch, and where it would be no particular improvement to the physiognomy to have the arches widened and the teeth all more conspicuous ; 3rd, where, for any reason, it is considered certain that the teeth will look too conspicuous if all were preserved ; 4th, when the patient cannot give the desired frequent visits for attention to regulating apparatus. In these cases it is nearly always best to extract the first bicuspids, or the second bicuspids if these teeth are showing most irregularity. If reciprocal traction is to be used the extractions should be done in both upper and lower jaws. If no reciprocal traction is to be used the extractions will generally be required only in the upper jaw, as in these cases the lower teeth are nearly always too receding already. In all cases it must be a rule that where a permanent tooth has already been lost in any one quarter, there, in that quarter, no further extraction is admissible.

The argument for extraction is intensified when the patient is over twelve.

Some of the cases that we are called upon to treat are, for various reasons, exceedingly refractory, particularly those undertaken when the patients are fourteen years old and more. This is due to the unyielding nature of the bone, combined with the difficulty of seeing the patients often enough. My most successful cases are those which were begun very early in life, when a number of temporary teeth were present ; but the cases I have undertaken where the patient has been over twelve years old have not been so uniformly successful. In some of the cases, although all the teeth have been brought into a correct occlusion, and all the teeth have been got into good alignment, the mouth in the end has been hideously full of teeth, and I wish I had extracted something. Then came Dr. Bogue with his theory, a theory which is worth enquiring into. His theory is that it does not matter how young you begin ; if you expand the arches when the temporary teeth are in place you lose nothing of that when the permanent teeth are cut ; that the permanent teeth come into as wide an arch as the temporary teeth have been pushed into. I have tried a number of cases, and the conclusion I have come to is that you do a tremendous lot of good and help the case on its way very much indeed by expanding the temporary teeth, and sometimes Dr. Bogue's theory is justified to the full ; but, on the other hand, in other cases, though the permanent bicuspids will erupt a good deal wider than they would have done if you had not expanded the temporary molars, they will want expanding still more. After the expansion is finished, it is always necessary to put in a retaining plate. The kind of plate I have always used is a simple palate plate in the upper jaw to fit closely over the palate and up to the necks of the teeth all round, with gold wire points if necessary to go between the cervices for securing the plates, just to maintain the expanded arch ; and in the lower jaw a narrow horse-shoe plate, similarly furnished, inside the lower teeth. If the patient wears a plate of that sort while the permanent bicuspids are being erupted, the plate will, to a large extent, guide them outwards,

even if they have a tendency to come inwards. Members of the Society have sometimes referred to treatment at very early ages, but I do not think I have ever treated a case before the age of seven.

Mr. Baldwin then exhibited a large number of slides of various cases illustrating his remarks, from which slides the accompanying illustrations are taken.

CASE I. LADY G.—A young lady who originally had pronounced contraction and post-occlusion of lower jaw. She, unfortunately, early in life had both first lower bicuspids removed, but no extractions in upper. As a young adult she was treated by a well-known German orthodontist, who expanded both jaws, and by means of reciprocal traction brought all the remaining teeth into good position and perfect occlusion, but refused on any account to extract anything from the upper jaw, even though the two lower bicuspids had already been lost. The result finally was that the case reverted into a case of post-occlusion of lower front teeth. The German orthodontist was clearly wrong in not making the number of teeth even in both jaws by extracting the first upper bicuspids as a preliminary to his treatment.

CASE II. MISS B.—An ordinary case of contracted arches and post-occlusion of lower teeth. This was treated by expansion of both jaws and reciprocal traction and a perfect result obtained for a time. The second lower temporary molars were persistent till after this treatment. These persistent temporary teeth then came out and were not followed by any successors. This caused the case to relapse into an appearance of moderate superior protrusion, and in the end necessitated the extraction of two second upper bicuspids and the pulling back of all the upper anterior teeth by means of a fixed appliance.

CASE III. Mr. O. M.—Second lower temporary molars persistent and in such a position as to show that they will be followed by no permanent successors. For comparison with the preceding.

CASE IV. MASTER E. B.—A very bad case of contracted arches with superior protrusion and post-occlusion of lower teeth. The teeth were all very large in comparison to the boy's size. By expansion of both arches and reciprocal traction the teeth were all brought into good position and perfect occlusion. The result in the end was that the boy looked *all teeth,* and though the parents decided against further interference, my own opinion is that the treatment ought to have included extraction of four first bicuspids.

CASE V. MISS S.—An ordinary case of contracted arches and so-called superior protrusion. This was treated by expansion of both arches and reciprocal traction, and a perfect result obtained, excepting that the teeth remained too much in evidence. In this case the parents were anxious for further treatment, so four first bicuspids were then extracted and the anterior teeth of both jaws pulled back by plates. This gave entire satisfaction.

CASE VI. MASTER K.—A boy of fourteen. Here the canines in both jaws are crowded outside the arches. Otherwise the arches are fairly well shaped and occlusion fairly good, and the incisors quite prominent enough for good looks, the arches likewise full

enough. Considering this and the age of the patient, and also the boy being away in the country at school, the best treatment, according to the writer, was to extract the four first bicuspids, slightly expand both arches, at the same time pull back the canines into place and slightly mould the rest of the teeth so as to produce the correct " Roman " form of arch in each jaw. This was done.

Case VII. Miss R. A.—Aged eight. Upper jaw very contracted. Post-occlusion of lower teeth very marked. Both jaws were expanded to the full with plates. Reciprocal traction was then put on and the occlusion brought to the normal. The permanent successors to the temporary molars in the upper jaw erupted in slightly too contracted an arch. The upper teeth were, therefore, again expanded with a plate and reciprocal traction reapplied. The result is up to the present time perfect. No extractions.

Case VIII. Master V. B.—Aged nine. A very bad case of contracted arches, superior protrusion and post-occlusion of lower. Both jaws were expanded and reciprocal traction applied. No extractions. Perfect result obtained, both as regards correction of deformity and occlusion. Work all done with fixed wire appliances. Patient attended to generally once every week. Retaining plates worn merely to keep the spread of the arches.

Case IX. Miss De R.—Aged $8\frac{1}{2}$. Contracted arches, superior protrusion and post-occlusion of lower. Perfect result obtained. No extractions. Both arches expanded (by plates), then reciprocal traction. Spread of arches maintained by retaining plates. Bicuspids erupted in excellent position, being guided by the retaining plates. No relapse two years later, *i.e.*, at present time.

Case X. Miss J. H.—Aged nine. A case of contracted arches. Temporary teeth expanded into good shape. Permanent teeth erupted not quite wide enough, and further expansion was done. No extractions. Result satisfactory.

Case XI. Lord C.—Boy aged ten, but state of development of teeth as of a boy aged eight. Temporary molars very carious. Extraordinary amount of post-occlusion of lowers. Lower incisors biting on the gum of the palate half-way up the anterior slope of the palate. A biting plate inserted in the upper with the biting platform sloping, so as to be, when in the mouth, an inclined plane sloping downwards and backwards. Great improvement from this means alone. It is intended to put on reciprocal traction when bicuspids have erupted and come into occlusion. Temporary molars still *in situ* at age twelve.

Case XII. Master N. R.—Boy, aged eight. Upper and lower arches very contracted. Both expanded fully by spring plate in upper and Mr. Badcock's expansion plate in lower.

Case XIII. Master S. A.—At age eight, there was not much superior protrusion nor contraction of upper jaw. Lower jaw, however, was narrow, but had ample accommodation for all the teeth. Lower front teeth all spaced. Temporary right upper first molars biting entirely outside corresponding lower teeth. Lower canines biting behind the normal by the amount of their own

width. Advice was given at this time to expand lower arch and apply reciprocal traction. Advice was not followed and no treatment applied. Result, three years later :—Condition aggravated. All four upper bicuspids biting outside lowers. Patient having internal cusps of first upper molars only in addition to front teeth in occlusion. In this, if the lower arch had not been contracted, the lower front teeth would all have been in marked post-occlusion, and the case would have presented the usual appearance of "superior protrusion." The case is remarkable from the absence of any contraction in the upper arch.

Case XIV. Master N. P.—Aged fourteen. Enormous amount of superior protrusion. Complete overbite of upper front teeth. Arches contracted, but teeth all in fairly even line. All teeth, especially upper front teeth, very large. Patient away at school and not able to be frequently attended to. Treatment resulting in great improvement, never succeeded in thoroughly eradicating the deformity ; consisted of—first—wearing a biting-plate, then expansion of both arches, then reciprocal traction. The comparative failure in treating this case I ascribe mainly to difficulty in seeing the patient often enough, added to age of patient and size of upper front teeth. The upper front teeth were never clear enough from lower front teeth to justify the belief that extraction of first upper bicuspids would do good. In the absence of successful reciprocal traction a tremendous overbite must have remained in any case ; therefore no advantage was to be expected from extraction of first upper bicuspids. I regret I did not try a skull cap and traction on upper front teeth by external rubber bands. The reason for not doing so was a desire to save the patient inconvenience, as he was sleeping in a dormitory with other boys.

Case XV. Miss H —This case presented itself when patient was aged about twenty-eight. There was a very marked superior protrusion, the upper front teeth projecting constantly out of the mouth in a very fan-like shape. There was a history of much treatment for regulation in childhood. All the upper bicuspids had been extracted for regulation purposes without apparently in the least curing the deformity, and now the first upper molars were in close contact with the upper canines. Both arches were very contracted. The upper incisors were, individually, very fan-shaped, being much broader at the cutting edges, in comparison to the necks, than normal. I treated this case in a very unusual way. I cut away all the upper front teeth interstitially with a diamond disc till I had produced parallel edges and large spacings. I then, by means of a plate, pulled in the four incisors until the spacings were all closed up. This completely reduced the deformity and has resulted in a permanent cure of the superior protrusion. Several of the cut teeth required filling at odd times afterwards. The models here shown were taken seven years afterwards.

Case XVI. Miss V. M.—This is a case of a young lady who presented herself, aged twenty-five, on account of irregular and projecting upper front teeth. The irregularity had come on entirely since the patient was about twenty. I found the unfortunate lady was suffering from a violent pyorrhœa affecting all the upper

front teeth and canines of both jaws. This was responsible for the loosening of all these teeth, their protrusion and their other irregularities, such as rotation and spacings. The socket of the left upper central was especially destroyed and the tooth exceedingly loose. The pyorrhœa was taken in hand and absolutely cured by local treatment. The teeth were then regulated by plates worn chiefly at night, combined with loose platinum collars with hooks soldered to them, slipped over the upper centrals for rubber bands for producing rotation. The six upper front teeth were then fixed in position by a rigid bar of gold let into a groove cut in their lingual surfaces, about half-way between the cutting edges and necks, and cemented in with oxyphosphate. This was done about two years ago and is quite firm. So far there has been no return of the pyorrhœa.

---

## Discussion.

Mr. George Northcroft, in opening the discussion, said there was one point about the apparatus which had been shown which should be noted, the lower vulcanite retention splint used after lower expansion without putting cleats on the tops of the teeth. In his experience the use of that plate without cleats had led to disastrous results. He had had the gum on the inside of the teeth stripped very badly off the lower molars by the sinking of the plate, even after only three months' wear. One of the points brought out clearly, he thought, was how very many of the cases ought not to have occurred at all, and in the light of present knowledge he appealed to all members of the Society, and to the profession at large, to warn parents of the absolute necessity of bringing up their children properly, and then such disastrous results at the age of 14, 16 and 17 would not occur. The idea to be aimed at was the practice of preventative orthodontics of the highest type. Following the line of argument which Dr. Sim Wallace was so wise in constantly repeating, looking after the diet of patients, teaching them to masticate properly and develop the muscles and the jaws, it might be taken as a certainty that there would be far fewer extreme cases to deal with. He was beginning to hold the opinion that mouth breathing and adenoids, and the presence of nasal stenosis, by no means accounted for all the post normal occlusion and all the narrow upper arches which occurred. He was inclined to think there must be a good deal more in the inheritance theory than was generally thought, although it was puzzling to imagine how the first case of post normal occlusion was acquired. Another point of great interest was the case of pyorrhœa. Dr. Black had recently written a very interesting article which was practically a wholesale condemnation of the use of antiseptics in dental surgery, and especially in the treatment of pyorrhœa, and it was interesting to know that such satisfactory results had been obtained by Mr. Baldwin by the use of antiseptics supplemented by the retention in a firm position of the teeth after treatment. He thought the firm retention of the teeth after they had been treated had led to the results Mr. Baldwin had shown.

Mr. May asked how Mr. Baldwin treated the irregularity in the case of pyorrhœa without disfiguring the patient. He also wished to know at what age Mr. Baldwin considered it best to apply reciprocal traction.

Mr. Rowlett said he had been impressed by the great difficulty which observers seem to have found in determining whether the teeth in the upper jaws were anterior to their proper position or not. In the cases which Mr. Baldwin found it necessary to treat by extraction after considerable treatment of a conservative kind, it was probable

he would have been able to decide whether it was necessary to extract at once if he had by some means a method of determining the correct position of the first upper molar to the outline of the face. Until a good number of results had been obtained by the prosopometer or some other method to determine the normal position of the first upper molar, the cases would continue to cause trouble, and treatment by extraction would be necessary after conservative treatment.

Mr. SPILLER said he had noticed in the first case shown that the irregularity was probably due to a shortening of the arch, and Mr. Baldwin attempted to correct the irregularity entirely by expansion, when logically he could have lengthened the arch at the back as well. In the second case he had a successful result ; the arch had not shortened, all the temporary teeth were in position, and it was impossible for the temporary molars to move forward. It was quite time that some clear notion was arrived at as to how the mandible advanced as distinct from the arch and the teeth, and at the same time whether it was possible for a mandible to exist in what was commonly known as a post-normal position. He had retained a case recently, where the patient had pyorrhœa, by stapling, but he was not able to cure the pyorrhœa in the least. That should be put in the scale by anyone who thought they might cure cases in the method Mr. Baldwin had mentioned. It would be interesting to know whether Mr. Baldwin had had any failures as well as the successful case he mentioned.

Mr. HEDLEY VISICK asked whether Mr. Baldwin considered it justifiable to put in a vulcanite retention plate for a child seven years of age after having expanded the temporary teeth, taking into consideration the fact that the child would have to wear that plate probably about three years. Was there not a grave risk of getting the child into bad habits of talking, and almost into St. Vitus's dance ? He thought it would be better to allow the bicuspids to erupt first and then expand. A fixed retainer would not be so liable to affect the child's teeth or gums. In the case of the boy in which the upper and lower arch were expanded and extraction resorted to, he had wondered whether it was best to extract in the first place and do the necessary expansion afterwards or expand first and then extract and draw the teeth back. It seemed that by taking out the teeth in the first place there was less movement in the other teeth required, and there was a better chance of getting a more permanent result.

Mr. PREEDY thought the great difficulty was to determine the amount of jaw growth which took place between the ages of ten and fifteen. Twenty years ago he was told that except in very few cases it was wise not to undertake regulation of teeth until the second molars had erupted. The result was that a good many cases which at ten or eleven years appeared to be crowded mouths had corrected themselves by the age of fourteen or fifteen. It was very difficult to say how much the jaw would grow, even taking into consideration the jaws of the parents. In one case Mr. Baldwin obtained good results by slicing the teeth, but that was no argument against extraction ; it was an argument against bad regulation.

Mr. MAXWELL STEPHENS said boys were sent to school away from their dentist, and it was important to give them the most efficient regulation, having regard to the inconvenience under which the work would have to be done. With extraction plus appliances it was easier to make their mouths efficient with the minimum of inconvenience. The mucous-membrane and the periodontal membrane should be irritated as little as possible.

The PRESIDENT said personally he believed most cases were due to the lack of development of the jaw, and he believed that lack of development was probably due to mouth breathing. He was sorry to

see Mr. Northcroft wavering. No doubt inheritance had something to do with it sometimes, but as a rule it arose *de novo* from persistent muscular traction in the wrong direction. He believed that cases that went back went back from the same cause, namely, that the mouth breathing had not been cured. He had one or two models which bore that out to his satisfaction. If the correct position of the first upper molar could be decided there would be no reason to be worried by Mr. Norman Bennett, but that was a problem not yet solved. He agreed with the remarks of Mr. Maxwell Stephens.

Mr. BALDWIN thought Mr. Northcroft's hint was quite a useful one.

Mr. NORTHCROFT said he simply put two little cleats in the inside middle sulcus of the first lower molars to prevent the plate from sinking in the mouth.

Mr. BALDWIN said he had had no trouble in that way. The vulcanite retaining plates were very light and simple, and worked perfectly well without any damage at all. If he noticed there was any damage arising he should immediately put something on, and the thing which would suggest itself to his mind would be a sort of crib of thin wire over the tops of the molars, between the teeth, to prevent them going down. But that was objectionable, as it interfered a little with the bite. He was rather surprised to hear Mr. Northcroft wavering about the cause of post-normal occlusion. Whether it was merely muscular traction in the wrong way owing to the mouth being kept opened through interference with nasal breathing, he did not know, but he believed firmly that nearly all cases were due to impaired nasal breathing in some way or other, and he believed in every one of the cases he had brought forward that evening the patients had had impaired nasal breathing through adenoids and had been operated on. With regard to Mr. May's question the regulating apparatus was worn only at night, and the reason he decided to try to cure the pyorrhœa was owing to the patient's comparative youth. He carefully scaled time after time, as the gums shrank and packed down into the pockets around the roots, certain medicaments, chiefly chinosol, over a largish period, and that was all the treatment given. With regard to the age at which he should perform reciprocal traction in cases of post-normal occlusion, he should do so as soon as he considered he could get the D bands comfortably on to the six-year old molars. Reciprocal traction was a wonderful method, with which one could do almost anything. It was a fact that with reciprocal traction the six-year-old molar went back in the upper jaw and the bicuspids followed, and the upper front teeth also followed, so that the position of the six-year molar was altered very much by treatment. In the same way the lower six-year molar came forward by the operation of the same force. With regard to Mr. Spiller's remarks, reciprocal traction was used which made the upper six-year molars go backwards and the lower six-year molars come forward. He thought there was such a thing as a post-normal position in the lower jaw. In most of the cases the upper teeth in front of the six-year molars were a little in front of their proper position, and the lower teeth were still more behind their proper position. He thought that pulling the lower jaw forward stimulated the growth of the condyle in the glenoid fossa, and the ramus, but a great deal of the effect was undoubtedly got in cases of reciprocal traction by the moving of the teeth themselves. The lower teeth came forward; whether the jaw bodily came forward as well he did not know; probably it did a little. He agreed with Mr. Visick that retaining plates should be watched to see that they caused no caries, but he had never known any damage from such plates. The patient was always instructed to keep the plate and the teeth very clean. He thought the best time to extract was immediately after the use of the biting-plate,

but was not quite sure that as much space would be gained in that way as by extracting later. He could not agree with Mr. Preedy that irregularities of the kind under discussion, at the age of ten or twelve, would improve by the age of fourteen. He did not believe the jaw grew one fraction of a millimetre between those times. He believed the width of the jaw was fixed from a much earlier age than that unless artificial means were taken to expand it. The jaw grew backwards to make room for the molars, but it did not grow in width much after the age of about six.

The thanks of the Society having been accorded to the authors of the papers and the members taking part in the discussion, the Society adjourned to November 8th.

## ORDINARY MEETING.

An Ordinary meeting of the Society was held at the Rooms of the Medical Society of London, 11, Chandos Street, Cavendish Square, on Wednesday, November 8th, 1911, Mr. W. Rushton, President, in the chair.

The minutes of the last meeting were read and confirmed.

Mr. Horace Marsh signed the Obligation Book and was formally admitted a member of the Society.

Mr. George Russell Edey, L.D.S.Eng., of Chislehurst, was balloted for and elected a member.

The President announced that a letter had been received from Mrs. Pigeon thanking the members of the Society for their kind expressions of sympathy with her in her recent bereavement.

The Hon. Librarian reported that he had received two copies of the Transactions of the American Society of Orthodontists, from the secretary of that society, with a request for exchange of publications.

This was agreed to and the thanks of the Society accorded to the American Society.

The President announced that the next meeting would be the annual meeting for the election of officers, and drew the attention of the members to their power of nomination under Rule 20.

Mr. Norman G. Bennett read a paper.

## A Case for Diagnosis and Treatment of Deciduous Dentition.

This is a case of a child aged five years and four months. You will notice that in the first photograph the upper jaw is at least of normal width if not rather wider than usual, but it is remarkably short from front to back, and you can see that the upper incisor teeth are very much tilted backwards. The lower jaw is practically normal.

In the second slide you see very distinctly the extreme height of the alveolus. There is considerable overbite, the lower incisors disappearing entirely behind the uppers. The central incisors are very much tilted backwards.

The third slide shows the right side of the mouth and you will observe that there is post-normal occlusion to the extent of one unit. You can see clearly the peculiar contour of the upper incisors, the crowns being tilted backwards to the extent of about 30 deg. The apices of the roots are not to any great extent out of position. There is no spacing between the central incisors and there hardly could be with teeth inclined so far backwards, although the child has arrived at the age at which one might expect it.

To illustrate Mr. Norman G. Bennett's Paper.

Fig. 1.

Fig. 2.

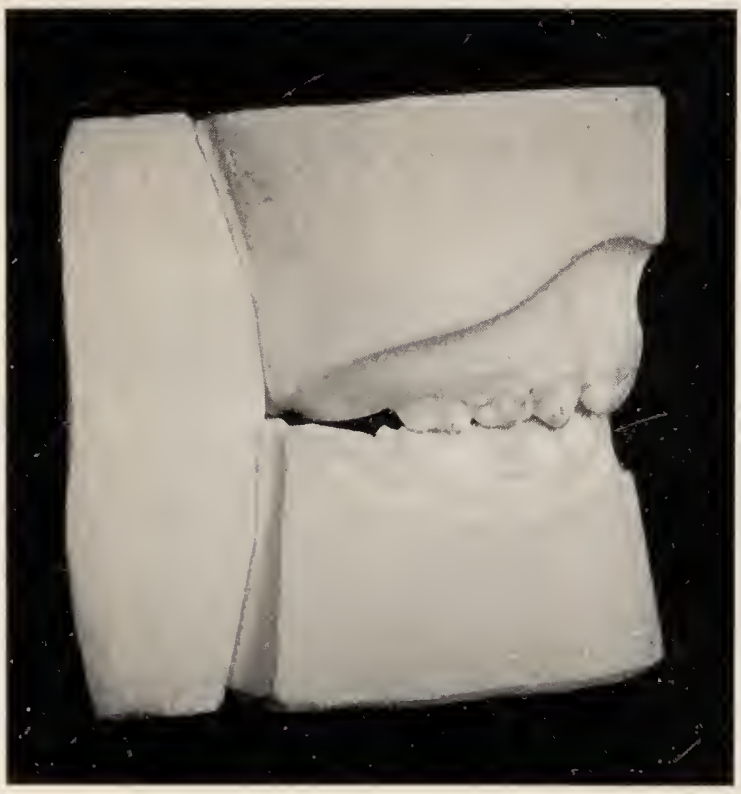


Fig. 3.

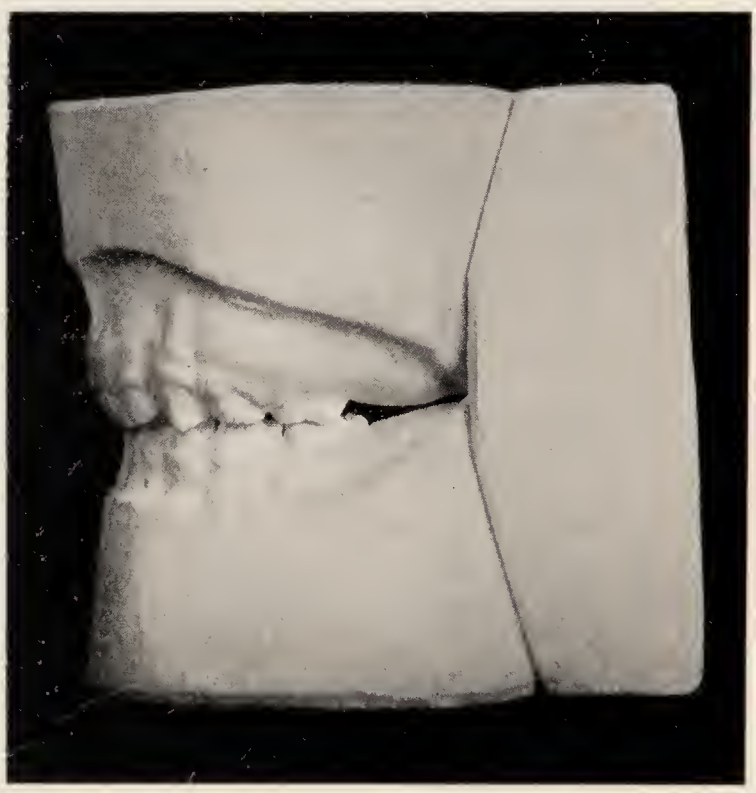


Fig. 4.

To illustrate Mr. Norman G. Bennett's Paper.

Fig 5.

Fig. 6.

Fig. 7.

The fourth slide shows the left side. The post-normal occlusion is practically the same as on the other side and there is lingual occlusion of the lower first molar ; that is to say, the outer cusp of the lower first molar bites almost on the inner cusps of the upper first molar, indicating, I think, that the lower jaw would like to come forward if it were allowed to do so by the upper teeth. I may remark that all these models are from composition impressions, and I think they show that one can take good models with that material.

The next slide shows the front view of the child. There is considerable width of face and the lips are obviously not placed together in any artificial way.

The sixth slide is a right side view, showing considerable recession of the lower jaw.

The next is a left side view.

What I desire to know is how to treat this case. The pronounced overbite is strongly resembled in the jaw of the mother of the child, and the post-normal occlusion exists both in the mother and father. The patient has a sister who is absolutely normal. The child was breast-fed for three months and after that was fed for another four months or so on real humanized milk, not milk merely diluted with water. After her teeth came she was fed on solid food ; she has never had any minced food at all. She has been fed from the very first in a natural way and from an early age she had a natural tendency to masticate properly. She eats an enormous quantity and takes a long time over her meals, as I think one might expect from the rather extreme width of the arches. She has never been a mouth breather. Another interesting point to my mind is that the upper incisors erupted some considerable time before the lowers, thereby giving an opportunity for the upper lip to push back the upper incisors, instead of, as is usually the case, the upper incisors being as it were moulded into position in front of the lower incisors. In that way it seems to me that the lower jaw from the very start was kept back, and as the other teeth erupted the lower jaw was fixed in that position. The child frequently bites with the lower incisors in front of the upper incisors. If the models were put together so that the edges of the lower incisors just slide in front of the upper incisors ; then the posterior teeth would be in normal occlusion. It seems to me that the proper treatment of this case is to advance the four upper incisors, especially the two centrals, and to give an opportunity for the lower jaw to come forward. Whether or not it would do that of its own accord I do not know, but if not I think the right treatment would be to bring it forward. I should particularly like to hear the opinion of members as to treatment and whether treatment should be commenced at once. I think myself it should be done at once because it would be very desirable if possible that the two jaws should be brought into normal occlusion before the eruption of the first permanent molars.

You may perhaps have noticed that I seem to know a good deal about this child and I may explain the reason is that it is my own, and for that particular reason I am anxious to do the best I possibly can.

## Discussion.

Mr. LEONARD MATHESON asked whether the appearance of the child showed a more retreating chin than that shown in the photograph of the right side ?

Mr. BENNETT thought the photograph fairly represented the condition, much better than the left side view.

The PRESIDENT asked whether any infantile habits had been noticed, such as compressing the lips.

Mr. BENNETT thought there were no particular habits.

Replying further to the President, Mr. Bennett said the teeth in relation to the arch were normal, but the arch was rather small.

The PRESIDENT further asked whether Mr. Bennett used the word " normal " in connection with the relation of the teeth to each other.

Mr. BENNETT said that was so.

The PRESIDENT thought he had to disagree with that. The teeth of a child of that age or two or three years younger ought all to be separate, and that was a point rightly emphasized by Dr. Bogue at the last annual meeting of the British Dental Association.

Mr. BENNETT said there was more space than appeared in the model, and that the uppers were not separated, but the lowers were more separated than appeared in the photograph. He quite agreed that there should be more spaces than there were.

Mr. GEORGE NORTHCROFT congratulated Mr. Bennett on the excellent presentation of his case ; it was one of the few cases presented to the Society which carried out the ideals with which the Society started—excellent models, excellent photographs and the early history. One thing specially noted was the order in which the temporary teeth erupted, and that was very difficult information to obtain from parents. It was a pet theory of his own that there might be something in the order of the eruption of the teeth that had caused the mal-occlusion. There were some very strong reasons for believing in inherited tendency to post-normal occlusion. Seeing that Mr. Bennett had so carefully observed the ease with which the child could put her jaw into normal occlusion he should feel inclined to treat the case as Mr. Bennett had suggested and move out the four temporary incisors and see if the jaw would not assume normal relationship. He believed that would be far sounder than attempting to move the jaw artificially into normal occlusion at the first start. He also strongly urged commencing the case at once. If the first permanent molars could be got to erupt in normal occlusion there was likely to be a permanent and satisfactory result. He had already succeeded in moving temporary teeth out for a child of two years and eleven months with very satisfactory results.

Mr. LEONARD MATHESON said it was perhaps a question whether the mode of treatment to which Mr. Bennett was inclined and which Mr. Northcroft had supported would be the best. It would be noticed in the profile view of the maxilla that the alveolus above the temporary incisors rather bulged out, which indicated that the permanent incisors were fairly forward. If the temporary teeth were pushed out there might be a danger of pushing out the permanent teeth still more before they erupted and when they came down they might have to be retracted. The upper lip by itself seemed to project quite as much as an upper lip should project, and if the upper incisors were pushed out in order to bring the lower incisors forward and to overcome the retreating chin it might be a question of risking making the upper permanent incisors project and result in a pouting mouth. As the child got older the central part of the face, the base of the nose, and the nose

itself would come more forward and counterbalance things. It might be possible to improve the present state of matters, but some things might become worse later on. Personally he should be inclined to let the case go on for another six or nine months, until the incisors erupted, and see if the maxilla did not take the opportunity of coming forward of itself, and if not, of helping it.

Mr. CHAPMAN, whilst agreeing with what had been already said with regard to the effect of the order of eruption of the temporary incisors on the backward position of the teeth, said it had struck him that possibly the upper lip alone might be sufficient to accentuate that. He was inclined to bear out the theory that heredity played a part in bringing about the condition, as he knew a family in which exactly the same condition existed in eight children, who had all marked overbite and one of whom could bring the lower jaw forward without showing much appearance of prenormality. He was in total agreement with operating at once to correct the condition, but no suggestions had been made as to how it was to be done. He gathered from Mr. Northcroft's remarks that he would use an expansion arch in the ordinary way, but some simpler means might first be tried. He would suggest that if the overbite was not too great either the temporary canines or the first temporary molars might be banded and a platinized gold wire fitted close to the necks of the teeth on the lingual surfaces, the wire being pinched at frequent intervals so as to force the teeth forward. It was possible the apparatus might not be satisfactory, but he believed it would work if there were not too great stress from the lower incisors. Apart from the expansion arch he was only able to think of a vulcanite plate which would open the bite and allow the teeth to move forward by means of springs as an alternative method of treatment.

Mr. NORTHCROFT thought the term "expansion arch" was rather an unfortunate expression, because in the present case it would not be used for expansion, but simply for regulation.

The PRESIDENT said the case was an interesting and puzzling one. It was a case undoubtedly of crowded teeth in a normal healthy child. Mr. Bennett stated that the arches were normal in width and that must mean that they were not so large anteroposteriorly. It seemed to him to be rather a bad argument for the vaunted effects of mastication to have such a result in a child who chewed hard food. A child who had always been taught to masticate well ought to be expected to have a better expansion of the teeth.

Mr. CHAPMAN said it occurred to him that the position of the lower lip in all but extreme cases was chiefly affected by the tips of the upper incisors and not so much by the position of the lower incisors themselves. He thought improvement as regards the position of the lower lip should be expected from the forward movement of the incisal edges of the upper teeth, which would have little or no effect upon the upper lip.

Mr. BADCOCK thought the danger Mr. Matheson foresaw would be obviated by the extraction of the four upper temporary incisors, which treatment would obviate the necessity for any apparatus and allow the mandible to come forward if it desired to. He had had a precisely similar case some years ago, except that the distance between the maxilla and mandible was greater. In his despair he went to Mr. Northcroft, who advised the above treatment, but it was not carried out. In that case he believed the lower incisors were erupting normally. It was extremely tempting to accept the theory that the mandible was held back by the position of the upper teeth and only desired a chance to come forward, but he had no belief in that theory. He believed the mandible occupied its position, not owing to some accidental mechanical cause, but that its position had to do with the general

development of the skull. He believed the backward position of the mandible was predestined from a much earlier age. By adopting the treatment he had suggested Mr. Bennett could settle the question whether the mandible would come forward and could make up his mind as to further treatment.

Mr. THOMSON suggested the use of the X-rays to see the actual position of the permanent incisors. It appeared to him that if the temporary incisors were pushed forward they would have more inclination to pull the permanent ones back. He thought the case illustrated the importance of keeping the child at the breast for the full time and not weaning it when it was four months old.

Mr NORMAN BENNETT, in reply, said all the methods of treatment suggested had occurred to him, but he had found great difficulty in coming to a decision and he thought the discussion would help him. With regard to causation, and as to why normal mastication had not produced a better condition, his view was that normal mastication and the growth obtained from it would not suffice to overcome unnatural tendencies. He believed the abnormality in the case was genetic; he believed it was undoubtedly inherited and was deep-seated. To his mind the child was born with a natural determination to grow in that way and he thought that mastication had to a large extent saved it from being worse. If the child had been fed on sloppy foods, not only would there be want of space in the anterior region—which to his mind was not so much want of space as of the teeth being in the wrong place—but the distance across the arch between the molars also would have been very much narrower than it was. The effects of mastication were primarily on the molars. With regard to the point raised by Mr. Matheson, he believed that if the teeth were advanced from the lower edges they would to all intents and purposes rotate around their apices, and no increase of prominence over the roots of the upper incisors would take place. For scientific reasons, apart from humanitarian ones, he preferred that method to Mr. Badcock's, because even although the teeth were due to fall out in about two years' time the one treatment was an attempt to help Nature now and the other was an interference with Nature, and he thought no one knew quite what the effects of premature extraction would be. The idea that the child should be X-rayed was an excellent one and he should certainly have it done. He did not believe that the artificial feeding after three or four months really made any difference. Of course, he always advised natural feeding, but he did not think artificial feeding was necessarily harmful. When he assured Mr. Thomson that it was a case of bottle-feeding or starvation he would probably agree that it was the right treatment to adopt.

The PRESIDENT said he knew of at least three children of ten, eight and six years who had been brought up on the bottle whose teeth so far were absolutely free from dental caries, in well-formed arches.

Mr. BENNETT said, with regard to the use of the arch, he should like to know whether Mr. Northcroft in cases of young children would use a band with a screw, or simply make a band to fit and cement it on.

Mr. NORTHCROFT said he certainly advised the use of the clamp bands. When banding temporary teeth the shapes should be carefully thought out. He thought a plain band would fit very badly. He had always disagreed with Dr. Bogue in regard to the Ainsworth appliance. His bands simply telescoped over the temporary teeth, and some of the cases he had seen had had a large amount of cement all round the teeth. It was quite true that teeth were lost sooner or later, and it did not so much matter, but he thought any chance of inflammation in the mouth should be avoided. If the vitality of the gum tissue was lowered the child might be rendered liable to all sorts of infection.

Mr. Hedley C. Visick read a paper on

## An Unfortunate Complication in Treatment of a Case of Mal-Occlusion.

In this case the patient was a girl born in July, 1894. She was first seen in June, 1908, and was practically a Class I. case with lingual occlusion of the upper molars on the right side. She was a typical case of a mouth breather. Upper and lower expansion arches were inserted at the end of June, 1908, and the case proceeded normally till about September of the same year, when pain was complained of in the upper left lateral incisor, which was getting loose. In October the pain was so bad and the tooth so loose that after careful examination it was decided to extract it and this was done with a local anæsthetic. The root was found to be totally absorbed, exactly similar to an absorption of a temporary tooth. The tip of the upper left canine could be felt in the socket or rather in the wound in the gum, because the extraction did not amount to much more than picking the tooth off the gum. Unfortunately I am unable to show you the tooth, as it was given to the patient to show her parents and was promptly lost. On the right side there were marked signs of the erupting upper right canine. Expansion was continued in the upper and lower jaw and things progressed favourably until the beginning of 1909, when pain was complained of in the upper right first bicuspid. The pain became worse and the tooth became so loose that it was reluctantly decided to extract it, and it was extracted under a local anæsthetic. It was found that the root was about two-thirds absorbed. The upper right canine had meanwhile showed itself anteriorly and labially to the upper right first bicuspid. During these months the upper left canine had slowly erupted close against the upper left central incisor. Treatment was continued until November, 1909, when a retainer was placed in position in the lower, consisting of bands round the lower first molars and a wire passing lingually round all the teeth. The upper was retained by means of a plate with wires passing behind the upper first molars and round in front of all the teeth. This plate caused a good deal of worry as it was twice lost and three or four times was broken by being sat upon. The present condition is as shown by the second models. It will be seen that the lower first bicuspids and the lower right central incisor have a tendency to be crowded out of the arch in spite of the retainer. Of course it is obvious that the lower arch is too big for the upper. When treatment was commenced the idea of course was to expand the upper arch in unison with the lower, but on account of the unfortunate complications the upper expansion had to be abandoned. The question is, should the lower first bicuspids be extracted to allow the arch to collapse ? The patient lives thirty miles out of London and it is difficult to see her more than once a fortnight. Her appearance has been greatly improved and the mouth breathing practically cured by perseverance on the part of the patient. The speech has been vastly improved. The amount of expansion in the mouth is as follows :—Upper molars 4·7 mm., lower molars 3·8 mm., upper second bicuspids 4·9 mm., and lower second bicuspids 14·6

mm., but of course this was mostly a tilting of the teeth. I have brought this case before the Society as it shows one of the possible complications in the treatment of a case of mal-occlusion.

---

## Discussion.

Replying to the PRESIDENT, Mr. Visick said the patient was now fourteen years of age, and the case was started when she was eleven years and a few months old.

Mr. BADCOCK thought it was an interesting case from many points of view, and wished to know why Mr. Visick did not think of extracting something in the mandible when the accident took place. It seemed to him that the only thing to do now was to extract something in the mandible and personally he was inclined to extract the outstanding lower central ; in that way the pressure on the lower arch would be relieved, the other incisors fall together, and the result would be quite good.

The PRESIDENT thought the case pointed out the risks that were run in undertaking an extremely long regulation. He thought the loss of the teeth was primarily caused by the continuous pressure exerted over such a long period. Personally, he should have done what Nature seemed to have done later on, taken out a couple of teeth in the upper and probably the same in the lower. He wished to know the present state of the gums and of the mouth in general. When one considered the tremendous amount of width gained, 14·6 mm., it was not at all surprising to find profound changes had taken place. Personally, he agreed with Mr. Badcock as to extracting the lower incisor and rounding the tip of the canine.

Mr. NORTHCROFT thought the absorption of the roots of the teeth was in no way due to the treatment. He had had similar cases which had been untreated where the lateral incisors had been either completely absorbed away or one side of the root had been completely absorbed by a crowded condition of the canine region, and it was only fair to Mr. Visick to point out that it was not the treatment that produced the absorption. One of the reasons why upper and lower models were always taken in orthodontic cases was because dentists believed in the principle of the harmony of the two jaws. If there were two teeth absent in the upper jaw the lower jaw must be brought into harmony, and he should certainly advise the removal of one or more teeth as might be decided after careful consideration. Twenty years ago regulation cases used to be shown with the upper model only, no attention being paid to occlusion at all, but that had been all changed.

Mr. HIGHTON thought the case was similar to one he had shown to the Society some years ago, in which he expanded the arch equally and was able successfully to bring one canine into place. The other canine was lying at an angle and had to be extracted. With regard to the lower jaw, if the incisor suggested by Mr. Badcock was extracted first and an arch placed on the lower jaw with contractile pressure in the region of the first bicuspid the bicuspid would probably go back and occupy the space.

Mr. CHAPMAN, whilst agreeing that the size of the two jaws should harmonize, gathered that in the particular case under discussion, as the jaws came together there was distal occlusion on both sides, and that really amounted to the loss of one unit or cusp on each side, which was sufficient to bring about harmony between the upper and the lower, seeing that a cusp had been lost on each side in the upper jaw. The trouble, in his opinion, lay in the great amount of overbite which

necessitated the lower jaw being smaller in proportion to the upper jaw than normally should be the case.

Mr. SPILLER said it was really not a post-normal condition of the lower jaw, but a prenormal condition of the upper molar and bicuspid. In the old days one would have been advised to make room for the missing upper teeth, but it was rather interesting that no one had had the temerity to suggest that treatment now.

Mr. HEDLEY VISICK, in reply, said with regard to the extraction of the lower right first incisor the great difficulty in the case was that the child's parents were very active in social work and the patient was much given to singing and speaking in public, and her parents were against extraction. The parents had been very pleased with the case as far as it had gone, as the appearance had been greatly improved. He should like to take out the lower incisor, but the parents objected. With regard to the extraction of the upper and lower teeth, he was certain that if he had extracted the first bicuspids in the upper and lower in the first place, the last state of the case would have been worse than the first, because it was obvious that the upper left canine did absorb the lateral, and the lateral was not treated. It was not a case of the treatment affecting the absorption, because as soon as the tooth was extracted the tip of the canine could be felt actually in the place where the lateral was taken out. With regard to the first bicuspid on the right side, he was rather doubtful himself whether it had not been partly due to the expansion, as the tooth had not the typical absorbed appearance, but had a rounded end. He thanked Mr. Northcroft for pointing out that the case was not one of mal-treatment. The overbite was very abnormal and the upper incisors were very abnormal, quite the longest upper incisors he had ever seen. The patient had a sister three years younger than herself with upper incisors 2 mm. longer than the lateral incisors. It seemed to run in the family. He thought that also accounted for the apparent overcrowding of the lower jaw. Although the teeth had all moved back one cusp they were still overcrowded on account of the excessive overbite. With regard to the prenormal occlusion of the upper teeth, it was quite possible that was largely the case; the upper teeth had travelled forward. The lower jaw seemed to be very much in the same position with regard to the bicuspids as it was at the start. It was only in the molar region that it seemed to be distal.

The PRESIDENT said he still persisted in thinking that had the upper bicuspids been extracted possibly the absorption of the lateral would never have taken place, and the canine would have dropped down into place. As for the lower bicuspids their position, in his opinion, made extraction the obvious procedure.

Mr. LOUIS JEFFERY read a communication on

## (a) Improved Anchor Bands for use in Cases of Inter-Maxillary Traction.

(*a*) During the past eighteen months I have had some half-dozen regulation cases in which I have made use of intermaxillary traction, and have had considerable trouble owing to the anchor bands becoming detached, so I thought the matter out and have, I think, discovered the causes and the cure. The causes were two, the first being due to the shape of the bands themselves. These are always straight bands and so do not grip the necks of the teeth as they would do if they were shaped as Lennox's matrix bands are. I therefore had some made with slightly curved bands as shown in Fig. 1, and find that they grip most tenaciously. I have brought some down which are made by the

Dental Manufacturing Company and which have been screwed on to the teeth with the fingers only, and it is impossible to remove them over the crowns. The other detail is that by having the screw made with a flange between the square head and the screwed portion, it is not possible for the squared head to force its way into the loose collar of the band and so cause loosening. I have tried the improved bands and find they act well. Of course, there is a little more material to tuck away on the crown of the tooth, but the use of contouring pliers makes this a simple matter. Messrs. Ash & Co. have also prepared some of their Simplex bands on similar lines, and I have brought them down for your inspection.

## (b) A Completed Case of Class II., Div. I. (Angle).

(*b*) The lantern slides of the completed case I am permitted to bring before you will speak for themselves. I will ask you to excuse the number of slides as they were more easily produced than would have been possible had they been assembled together more closely. Slide 2 shows the patient in August, 1910, and slide 3 the same in profile, Slide 4 the right side of the mouth at the time, and 5 the left side. It will at once be seen that the lower premolars are just distally occluded one tooth. Slide 6 shows front view of teeth and 7 the palatal and lingual aspects. Slide 8 shows the models after the case was finished from the same aspect. Slide 9 shows the right side at finish, and 10 the left side ditto, 11 being the completed case from front. Slide 12 shows the patient full face last Saturday, being fifteen months after the case was started, although I may say that the case was completed last February, the treatment occupying just six months. Slide 13 shows profile of case, and I think you will agree with me that the result has more than justified the work. In the last slide I show I have assembled four photographs of the patient, so that you may more readily see what improvement has been effected.

---

## Discussion.

Replying to Mr. NORTHCROFT, Mr. Jeffery said the patient was fourteen years old when he commenced treatment and fifteen when he finished.

The PRESIDENT thought it was an extremely useful modification of the anchor band.

Mr. C. T. MORRIS thought a very good hold was obtained with the ordinary "Angle" band by turning down the bolt, and a demonstration had been given by Mr. Visick at a recent meeting of the Society. If the bolt was bent down it obviously pulled the bottom part of the band tighter than the top.

Mr. JEFFERY said what he had shown was not a modification of the "Angle" band, but of the "Lukin" band.

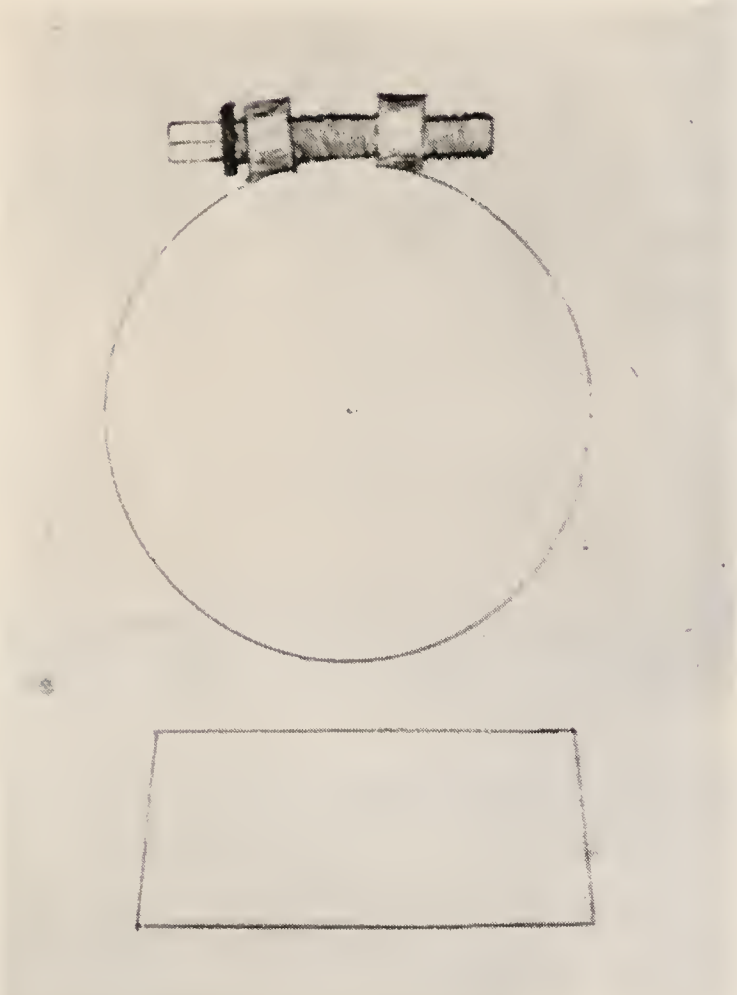
Mr. RUSSELL BARRETT asked whether there was any trouble in retaining the case.

Mr. NORMAN BENNETT desired some further history, as, for instance, whether there were adenoids or any history of thumb-sucking or habits of that kind.

Mr. SPILLER asked whether the bands were cemented in position and contoured at all.

Mr. JEFFERY said he had not used the Simplex bands, but had seen them in Ash's catalogue. They were fitted differently, the regulating wire going round the arch and put through the Simplex band with a

To illustrate Mr. Louis Jeffery's Paper.



Mr. Louis Jeffery's Improved Anchor Band

Fig. 1.

Fig. 2.

Fig 3

Fig. 4.

Fig. 5

Fig. 6.

To illustrate Mr. Louis Jeffery's Paper.

Fig. 7.

Fig. 8.

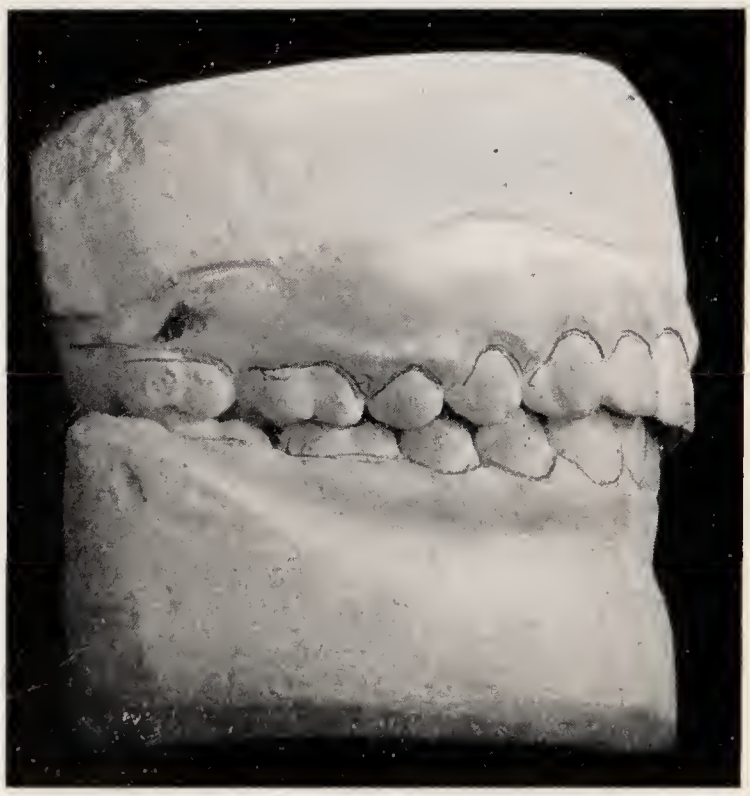


Fig. 9.

To illustrate Mr. Louis Jeffery's Paper.

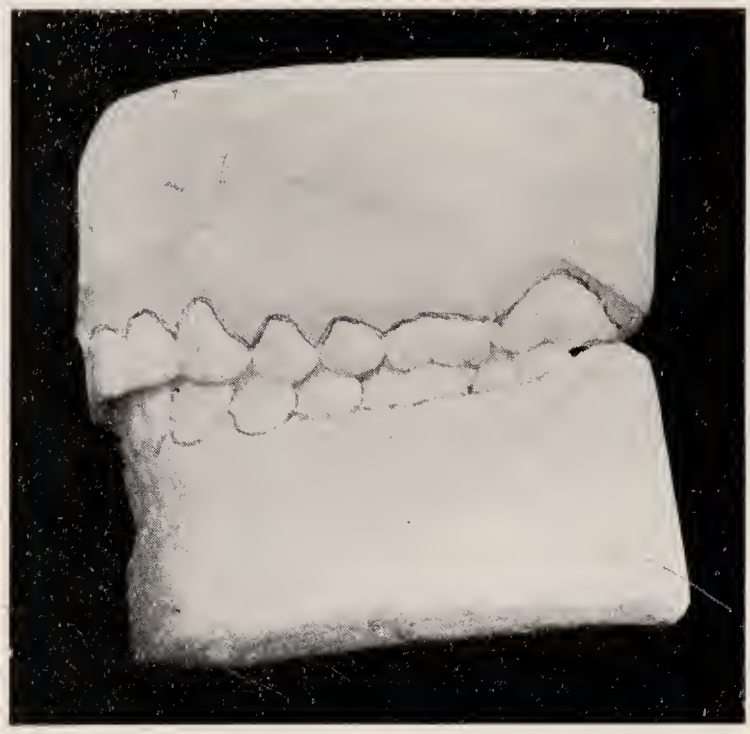


Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

nut both back and front, so that it gripped itself on and gripped the wire at the same time. He was sorry he had no history of the case as to how the deformity arose ; his trouble was to cure it. With regard to retaining the case he had had a good deal of difficulty, but he had cemented double bands on to the second premolar and first molar together, upper and lower, and fixed to each pair a triangular piece of metal so that the lowers were forced into occlusion in front of the uppers. He had first tried cementing the regulating bands in position, but with the band he showed he did not think cement was necessary.

A communication by Mr. C. S. Morris was postponed and a communication by Dr. J. Sim Wallace was not taken owing to his unavoidable absence.

The thanks of the Society having been accorded to those contributing to the evening's agenda, the meeting adjourned.

---

## ANNUAL GENERAL MEETING.

The Annual General Meeting of the Society was held on Wednesday, December 13th, 1911, the President, Mr. W. Rushton, in the Chair.

The Minutes of the previous meeting were read and confirmed.

The ballot for the election of Officers and Councillors was opened and remained open for one hour. Messrs. Blaaberg and Jeffery were appointed scrutineers of the ballot.

Mr. Ralph Chapman, L.D.S.Eng., was balloted for and elected a member.

The Hon. Secretary (Mr. Harold Chapman) read the following Annual Report :—

### Hon. Secretary's Report.

Seven meetings have been held during the year, at all of which there has been a good attendance. The attendance reached a record in the history of the Society at the Demonstration Meeting in May, when 41 members and six visitors signed the attendance book ; it is possible that these figures do not represent the total attendance. The work of the Session includes three papers, two evenings devoted to Cases and Problems for discussion, one Demonstration Meeting, and the Annual General Meeting with which a discussion was included. Numerous Casual Communications have been given during the year. The membership total of the Society continues to increase ; it now numbers 85.

On the motion of Mr. H. Baldwin, seconded by Mr. J. H. Badcock, the Report was received and adopted.

The Hon. Treasurer (Mr. W. F. Mellersh) presented the following Report :—

### Hon. Treasurer's Report.

It gives me pleasure to report that the statement of accounts for this year shows the progress of the Society to be uninterrupted.

Commencing with a balance of £36 16s. 10d. our income received in subscriptions was £87 3s., the subscriptions received during the period December 1st, 1909, to November 30th, 1910, being £82 19s., a satisfactory increase.

Reference to the expenditure side shows that the cost of administration was increased by £13 15s. 9d., Reporting is £8 8s. more, Printing and Stationery for the ordinary work of the Society cost a little less,

# THE BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS.

*STATEMENT OF ACCOUNTS FROM THE 1st DECEMBER, 1910, TO 30th NOVEMBER, 1911.*

| 1909-1910. £ s. d. | RECEIPTS. | £ s. d. | 1910-1911. £ s. d. |
|---|---|---|---|
| | To balances brought from last account :— | | |
| 12 11 2 | Cash at bank .. .. | 36 16 0 | |
| 3 5 | Cash in hand .. .. | 0 0 10 | |
| | | | 36 16 10 |
| 82 19 10 | ,, Subscriptions received during the year.. | | 87 3 0 |
| £95 13 7 | | | £123 19 10 |

| 1909-1910. £ s. d. | EXPENDITURE. | 1910-1911. £ s. d. |
|---|---|---|
| 15 15 0 | By Rent.. .. .. .. .. .. | 15 15 0 |
| 7 7 0 | ,, Reporting .. .. .. .. .. | 15 15 0 |
| 15 2 1 | ,, Printing and Stationery .. .. .. | 14 12 11 |
| | ,, Printing and Circulating Mr. Spiller's paper .. .. .. .. .. | 7 4 6 |
| 2 16 0 | ,, Process Blocks .. .. .. .. | 4 14 8 |
| | ,, Library Books .. .. .. .. | 1 2 6 |
| 6 10 6 | ,, Lantern and Accessories .. .. | 4 5 6 |
| 1 2 0 | ,, Materials for Demonstration .. .. | — |
| 6 10 6 | ,, Refreshments .. .. .. .. | 5 1 6 |
| 3 13 8 | ,, Postages, Telephones and Sundry Expenses .. .. .. .. | 4 0 11 |
| 58 16 9 | | 72 12 6 |
| | ,, Balances carried to next account :— | |
| 36 16 0 | Cash at Bank .. .. 50 2 0 | |
| | Cash in hand : Hon. Sec., 7s. ; Hon. Treasurer, 18s. 4d. 1 5 4 | |
| | | 51 7 4 |
| £95 13 7 | | £123 19 10 |

We have examined the Books and Vouchers, and certify the above Statement of Accounts to be correct.

C. PATCH POLLITT,
FRANK J. PEARCE, } Auditors.

and more has been paid for process blocks, evidence that the Transactions have been more fully illustrated ; there has been a distinct saving in the account for Refreshments, and the Sundries account is slightly heavier.

The available balance is £51 7s. 4d.

During the early years of the Society's existence there have been many calls on our revenue which may be well described as flotation expenses, and such as are not likely to recur—hence we may hope for better bank balances in the future.

In handing my papers to my successor I take this opportunity of saying what a pleasure it has been to me to have been a member of the first executive of this Society which has already done so much for the practice of Orthodontics in this country.

On the motion of Mr. Lewin Payne, seconded by Mr. Schelling, the Report was received and adopted and the thanks of the Society accorded to Mr. Mellersh for his work during his Treasurership, from which position he was now retiring.

The Hon. Curator (Mr. Wilton Thew) presented the following Report :—

## Hon. Curator's Report.

The museum has not greatly increased in size during this year.

Models of an interesting case of extreme anterior open bite in a Hindu have been presented to the Society by Mr. J. H. Badcock, on behalf of Mr. C. F. Badcock, of Madras.

A request was received from the Honorary Secretary of the Bristol Section of the Western Counties Branch of the British Dental Association for models illustrating Angle's Classification to be exhibited at an orthodontic meeting. These were prepared and will be added to the museum.

I should like to remind members that the curator will welcome models of cases of interest and appliances for inclusion in the museum in order that the day may come when the museum will be an institution worthy of this Society.

On the motion of Dr. J. Sim Wallace, seconded by Mr. Harold Chapman, the Report was adopted.

The Hon. Librarian presented his Report as follows :—

## Hon. Librarian's Report.

During the past year the Library has made, unfortunately, but little progress.

The following additions have been made during the year and the thanks of the Society are due to the donors :—

Three copies " American Orthodontist " presented by Mr. Hubert Visick.

Copies of the " Journal of German Orthodontic Society," presented by Dr. J. Sim Wallace.

Two copies of " American Orthodontist."

The following is a list of the works now in the Library :—

| | |
|---|---|
| Essays on Irregularities .. .. | Sim Wallace |
| Atlas of Skiagrams .. .. .. | Symington & Rankin |
| Development of Human Maxillary Bones and Teeth .. .. .. | Witzel |

| | | | | |
|---|---|---|---|---|
| Orthodontia | .. | .. | .. | Case |
| Malocclusion | .. | .. | .. | Jackson |
| Irregularities | .. | .. | .. | Talbot |
| Orthodontia | .. | .. | .. | Guildford. |

Transactions of the B.S.S.O. besides the Journals mentioned above.

I should like to draw the attention of members to the rules of the Library, and in particular to point to the rule which states that "books must be returned at the end of a month, or a special application made."

In conclusion I may say that I shall always be glad to receive any literature bearing on our subject, which members may feel inclined to present to the Society, and also to have the names of any books which it is thought our library should contain.

Mr. HEDLEY VISICK moved the adoption of the Report, which was seconded by Mr. GEORGE NORTHCROFT and carried.

## Alteration of Bye-Laws.

The PRESIDENT proposed on behalf of the Council an alteration to Bye-law 2 with respect to the election of Honorary Members. The proposal was to insert after the word "practitioner" the following words: "distinguished foreign and Colonial practitioners of dental surgery," and after the word "surgery" in the next line to insert the words "in the British Isles," the Bye-law as amended reading, "distinguished foreign and Colonial practitioners of dental surgery, distinguished practitioners of dental surgery in the British Isles who have retired from practice, distinguished medical practitioners, and those who have gained distinction in any department of science, shall be eligible for honorary membership."

After some discussion the proposition was carried.

## Mouth Breathing and Facial Contour: with a Suggested Classification.

The discussion on the PRESIDENT'S paper on this subject, adjourned from the January Meeting, was then proceeded with. In the absence of Mr. M. HOPSON the following remarks sent in by him were read by the SECRETARY in opening the discussion:—

"It will be within the recollection of the members, that when our President read his interesting and original paper, in January last, there was no time for an adequate discussion. I moved, therefore, 'that the paper be brought up for consideration at some future meeting,' quite oblivious of the fact that I therein incurred the responsibility of introducing the subject to you again. When I read the paper after it was published there appeared to me to be several matters contained in it, upon which some criticism might be made, but upon re-reading more than once, I am free to admit that I have found it extremely difficult to seize upon particular points and drag them into the light of controversy, without at the same time dissociating them from some qualifying context, which would do an injustice to the reader of the paper.

We have had many methods of determining facial angles and the relation of the jaws to the cranium before, but Mr. Rushton's originality

lies in the fact that he has endeavoured to correlate the mandibular angle with the facial, or as he calls it the auriculo-facial or profile. He has taken as his points of measurement a spot corresponding with the glenoid cavity, the angle of the mandible, the most prominent part of the chin, and the base of the nose, regarding the first and last as stable points. By joining these points in the same plane a quadrilateral figure is obtained, the upper anterior angle of which gives the profile angle, the lower posterior angle, the mandibular. The former, in normal skulls, averages 73 degrees, the latter 115 degrees. Now, the angles depend upon the relative lengths of the sides. Granted a mandibular angle of a given number of degrees, formed by sides of a quadrilateral of known length, it follows that the profile angle will depend, in part, upon the length of the other two sides, and in part, upon the relation of the points afforded by the base of the nose to the position of the glenoid cavity. Mr. Rushton regards these as more or less stable points, but I am not at all sure that this is so, and I should be glad to hear the results of investigations, for it is quite possible, indeed I think it is often the case, that the levels of those two points, and therefore the angle formed by the intersection of the lines joining the base of the nose, the glenoid cavity, the angle of the mandible may vary also.

I was struck particularly with the measurements given of the relative lengths of the ascending ramus and the body of the mandible. In the case of mandibles, in which the profile is normal, the body measures 1½ inches more than the ramus, in the retracted mandible 1 inch more, and in the protruded mandible only 1½ inches more. In the latter case I should have expected a much greater difference, particularly when one remembers that in these cases there is an increase in the depth of bone at the mental region. The greater angle of course has to be taken into account in this connection, and as has been pointed out, the lengthening of the face. In his paper, Mr. Rushton is dealing entirely with the profile, and granted that mouth-breathing has a great influence on the profile, the question arises as to how far this perverted action reacts upon the mandible and maxilla respectively. My own opinion is that the maxilla suffers primarily, and as a result the mandible, as it were, runs riot.

With regard to the suggested classification, I believe it will prove very useful, if it is combined with measurements of the width of the face. The whole question resolves itself into the production of harmony, full face, as well as side face.

I feel that we are much indebted to our President for bringing before us such an original and in every way, such a suggestive piece of research."

Mr. George Northcroft said he had read over what he said immediately after Mr. Rushton's paper was delivered and had found nothing which he wished to retract. Mr. Rushton had drawn attention to the value of a knowledge of the relationship of the jaws to the cranium as distinguished from the position of the teeth, and as far as he could understand the subject he thought it was very necessary to recognise that there was an important difference between the position of the jaws and the position of the teeth in those jaws. Therefore there were bound to be two classifications, one for the facial harmony, the relationship of the jaws to the cranium, and the other for the relationship of the teeth to one another in the jaws. On thinking over the matter still further he felt that it in no way assisted to determine the normal position of the upper six-year-old molar, which from the practical orthodontist's point of view in treatment was a very important

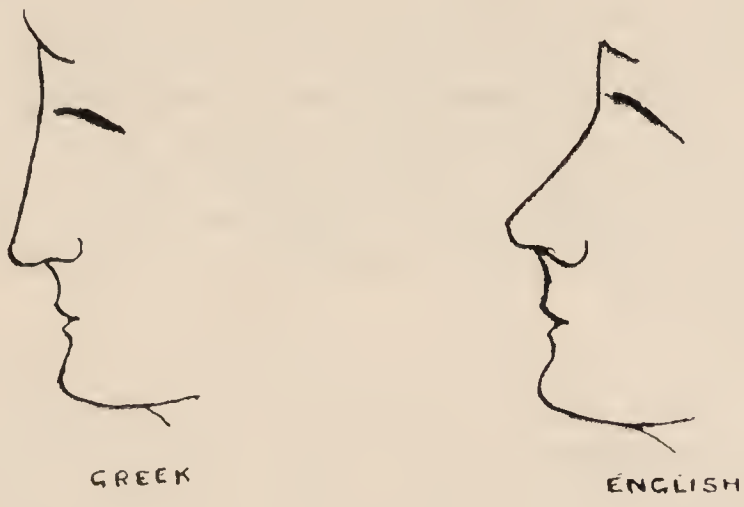
matter. If the position of the six-year-old molar in the jaw could be determined, and the position of the jaw in relation to the cranium, it would be a very great step towards knowing exactly what was wrong with the patient. Also it seemed to him that the President argued that the inharmoniousness of the features was brought about entirely by the relationship of the jaws and that it was only by treating the jaws themselves that harmony could be restored. He believed it was necessary to modify that idea. Take, for instance, an Angle Class III. case, where the lower jaw was very much protruding ; that condition could be very markedly improved by lessening the size of the dental arch and it produced a better harmony of the features, even if it left the mental prominence where it was. By reducing the size of the dental arch there was an apparent decrease in the size of the jaw itself and from the point of view of harmony of the features he thought it was a matter that should not be forgotten. Incidentally, in the comparative classification where the method was applied to the Angle classes, he thought a mistake arose in describing Angle's Class II. Division 2, as the upper maxilla being normal. The upper maxilla should certainly be described according to Mr. Rushton's classification as minus, because in the majority of Class II. Division 2 cases (Angle) the upper central incisors were in-standing, and to correct the occlusion it was necessary to bring the upper centrals forward as well as the lower jaw forward, and that seemed to imply that the maxilla was minus as well as the mandible.

Mr. SCHELLING said the President's remarks with regard to adenoids were recalled to his notice the other day by a patient, a small child of about ten years of age, whose upper front teeth were very prominent, and he thought of leaving any immediate treatment of the condition until the upper canines had erupted. A little while after, however, the doctor who was looking after the child wrote and asked him whether he would not consider it a good plan to start expanding the upper jaw with a view to making the airway in the nares larger, because he thought if that were done it would help the child to better nasal breathing. After taking counsel with those who had more experience in the matter than himself he wrote to the doctor to tell him he was quite prepared to start treatment, but thought it a better plan, if any operation were to be performed upon the adenoids, to give the child the benefit of having them cleared out to begin with and later on start the expansion. He had occasionally found that when the permanent canines were not erupted the upper front teeth would not budge when an attempt was made to draw them back, as the unerupted canines blocked the passage backwards of the incisors.

Mr. J. H. BADCOCK said the paper was most interesting, suggestive, and original, and there were only one or two small criticisms he wished to make on certain points. It seemed to him that the statement that all irregularities of the features (apart from dental and traumatic sources) were caused by the abnormal relations of the jaws to the cranium was not quite correct. A great deal depended on the mental prominence and it seemed to him, in orthodontic work, very often sufficient importance was not attributed to that. People said that a person had a receding chin and it was only necessary to look after the mandible to make that person a handsome and firm jaw, but that was not so ; it depended on the development of the mental prominence. The next statement in the paper he took exception to was : " These abnormalities are generally caused by continuous abnormal muscular action, the outcome of the vicious habit of breathing wholly or partially through the mouth in early youth." It had long been his belief that mouth-breathing had less to do with the production of such irregu-

larities than was generally thought, and he based his belief on the fact that it was not at all infrequent to see cases of very marked post-normal occlusion, often with protruding incisors and often with receding chin, in patients who were not mouth-breathers and never had been. He had seen two that very day, both small boys. Both of them had marked post-normal occlusion. The elder had two incisors which stuck out over his lower lip or were held firmly between his lips in a position of rest so that they were not seen when the lips were at rest If that condition arose in those two children without any mouth-breathing at any time it seemed to him that it might arise concomitantly with mouth-breathing in other children without necessarily being caused by that.

Dr. J. Sim Wallace said at the beginning of the paper Mr. Rushton showed an excellent model of a Greek face, which was no doubt beautiful, but there were other types not peculiarly Grecian which were also beautiful. He had given up the hope of ever having ideal measurements for a type of beauty. There were quite different types and no measurements were suitable and no arrangement of angles he could imagine would be suitable to act as a definite guide.




Dr. Sim Wallace drew two types of face on the black-board, one Grecian and the other non-Grecian and said he preferred the non-Grecian. In the Grecian face a line drawn straight down was well to the front, but a straight line in the other face came well back in the lower part of the face, the maxilla in the second face being thrown forward so that there was a large space between the back of the maxilla and the foramen magnum. Though the angles were all different, both faces were beautiful. Another point in the paper was that Mr. Rushton had made rather much of mouth-breathing as being almost the sole cause of irregularities. He thought it was necessary still to keep to the idea that insufficient mastication tended not only to lessen the growth of the jaw, but also to allow of the lengthening of the face which was characteristic of the ill-brought-up child. There was also malnutrition, which could commence at a very early age quite independent of mouth-breathing. It had been brought out by Mr. Colyer that the dirtiness of the feeding bottle or some such thing tended to give rise to abnormal development. There was no doubt there were many cases of marked post-normal occlusion with no history of adenoids or mouth-breathing. What he had said was not in antagonism to the President, as he had read the paper two or three times and each time with more and more appreciation.

Mr. MELLERSH said it was suggested to him some years ago that possibly one factor in the production of abnormaliites in the jaws was difficult parturition, and he wished to know whether any member of the Society had ever considered that question.

Mr. HAROLD CHAPMAN said he was interested in the classification which Mr. Rushton had suggested and it reminded him of one which Dr. Sim Wallace suggested at the Royal Society of Medicine some two or three years ago. When analysed it seemed they were very similar to the Angle Classification after all, and that a very slight modification would give exactly the same result, except that perhaps Mr. Rushton's would make more clear the actual clinical conditions present. Taking the latter there was first the maxilla and mandible normal. Then came the maxilla *plus* and the mandible normal, which simply meant protrusion with the mandible in its correct position, *i.e.*, it would be a Class I. case with the protrusion of the upper incisor teeth. Then came double protrusion, maxilla *plus* and mandible *plus*, and for that Angle made no provision. In the next case given by Mr. Rushton the maxilla was *plus* and the mandible *minus*, practically identical to Angle's Class II. Division 1. In the next the maxilla was normal and the mandible *minus* ; then came the hare-lip in which the mandible was small ; it really corresponded to an Angle Class I. Then came both the mandible and maxilla small and a condition described as absence of teeth and non-development, and that seemed to be identical with Angle's Class I. ; there was lack of development in both the upper and the lower jaws, although their relationship to one another was the same. The next classification given by Mr. Rushton was a variety of Angle's Class III. Those classifications, although arrived at by very different processes, were really very similar to one another, and combinations of them ought to supply the practical ideas orthodontists were looking for.

The PRESIDENT, in responding to the discussion, said since he read the paper before the Society he had delivered another one before the British Dental Association, and in that paper he recanted some part of what he had previously written. The more he studied the subject the more he found there was something to be said both for mal-development and for heredity. In the paper now under discussion he put everything on to the shoulders of continuous muscular action caused principally by mouth-breathing, but when he took up the question of the Hapsburg face and studied many hundreds of portraits he could not help feeling convinced that heredity played a considerable part in the matter ; that after a certain time a certain tendency became fixed, became what is called a " dominant," and there was a considerable probability that that would reappear again and again. In the *British Dental Journal* of June 1st, 1911, there was a very thoughtful paper by Rollinson Whitaker, in which he seemed to have had success with the exhibition of thyroid in children who were affected with want of development of the bones. It was not altogether a convincing thing, because one would wish to know why Nature refused to develop the palate while in many cases all the other bones of the body were well developed. No doubt many had seen very fine, well-developed people with very narrow palates, and he himself had seen many patients of that sort. If it was a general insufficiency of thyroid it might be expected to manifest itself not only in the palate bones, but in other bones as well. It might not be muscular traction alone or the weakness of bone due to lack of thyroid alone, but it was quite possible it might be the two together. There were many people who denied that mouth-breathing caused mal-development, and although he thought they were wrong, he was of opinion that it was possible mouth-breathing had been brought too

much into prominence and that there might be other factors of which as yet very little or nothing was known. To his mind it was pretty certain that the worst cases of facial deformity were connected with blocking of the nose and breathing through the mouth. He still held that the breathing through the mouth manifested itself in a modification of the mandibular angle, that if a child, even for a few months, consistently held its mouth open, so the mandible by constant muscular traction in a certain abnormal direction was modified, just as a tree which was always blown on by a wind from one direction took a certain curve and kept that curve. Probably it was quite impossible ever to restore that jaw to its proper normal angle. It was quite possible that the two points criticised by Mr. Hopson, the one just in front of the ear and the one at the base of the nose, were not absolutely stable. In the Negro at any rate be believed they were different from the Caucasian skull, but he believed as working points they were as stable as anything that could be obtained. Although in cases where the angle of the mandible was larger than normal the jaw might be too far forward, yet he had never found a case in which the total length of the jaw was as long as in cases where the mandible was normal. The normal mandible was the largest one, the one in which there was most room for the teeth. He believed it was a fact that a large mandibular angle was always accompanied by a smaller jaw. Taking the full measurement of any jaw it would be found that the nearer the jaw approached a right angle the longer the jaw, and the more it approached a straight line the shorter the jaw. Mr. Hopson believed that the maxilla suffered primarily, and Mr. Colyer, quoting Prof. Keith, put it down primarily to the fact that the antrum was not properly developed. But why was not the antrum properly developed? The antrum was one of the factors in facial contour and it was a reasonable thing to suppose that constant muscular pressure would prevent the antrum being developed. In mouth breathers it would be noticed that there was not the normal malar prominence, but a hollow, cavernous sort of face in many cases, showing that the antrum had not been properly developed. To put that as the primary cause might quite easily be putting the cart before the horse. With regard to the production of harmonious relationships, he was quite convinced that after a certain time of mouth breathing pure harmony could never again be restored; it was only possible to make the best of a bad job. The great aim should be prevention. Mr. Northcroft had pointed out that there was a difference between the position of the jaws and the position of the teeth in those jaws, and it was quite possible two classifications might be necessary. That was a point well worth the attention of the Society and there was a Committee at present working on the subject. Mr. Northcroft and Mr. Hopson also said that sufficient attention had not been paid to the full-face harmony, but in the paper that was mentioned and measurements given. There it was said: "In these cases not only is the face lengthened, but it is also narrowed from the temples downward. It also becomes shallower from the front backwards, owing to the obtuseness of the angle and the non-development of the mandible. From a series of measurements at the British Museum I have come to the conclusion that the proportions of the width and length of the ideal face accepted by the Greek sculptors were as follows:—Width of face (measured from the widest part of the zygomatic arches) is to the length of face (measured from the nasion to under surface of chin) as 108 to 100. Measurements of young children show that the face is proportionately wider, about 130 to 100. The few measurements I have taken of abnormal adult faces with an average mandibular angle of 125° show that the width of the face is

only equal to the length of it, the proportions being 100 : 100." With regard to finding the spot which the upper six-year-old molar should occupy he was afraid he was as far off that desideratum as anybody else ; it was an important thing, but whether it could be actually determined or not was a question. It seemed to him the only way to do it was to take a very large number of models of different normal types and form conclusions from them. He agreed with Mr. Northcroft that much could be done by treating the teeth, although the jaws themselves were out of proportion. In fact after a certain age, it was impossible to do anything to the jaws, as in Angle's Class III., but a good deal could be done by reducing the size of the lower arch and by expanding the size of the upper arch simply by treatment of the teeth alone. He was glad to hear that Mr. Schelling took the very firm stand he did with the doctor with whom he was in correspondence. It was most important that adenoids should be removed first of all and at an early age, and that could not be too strongly insisted upon, as it gave the child the best possible chance. If teeth were regulated and mouth-breathing still went on a good deal of the trouble recurred. With regard to Mr. Badcock's remarks, as a rule an abnormality caused by the mental prominence was rather an advantage than a disadvantage, as it gave the face a firm character. He did not, however, quite understand Mr. Badcock's argument there.

Mr. Badcock said he thought perhaps sufficient importance had not been attributed to the growth of the mental prominence apart from the prominence of the mandible as a whole. In some jaws the mental prominence was well developed and in others it was ill developed and yet the body of the jaw itself might be in the same position.

The President said that was so and it was particularly seen in the jaw of O'Brien, the giant, in the College of Surgeons. There there was an enormous mental prominence, which was very often found in cases of giantism. He would like to know in such cases of mental prominence or the reverse what was the mandibular angle. Mr. Badcock was of opinion that mouth breathing was not always the cause and mentioned that he had seen some cases which had never been mouth breathers. That was a statement it was very hard always to verify. It was necessary to be very careful to see whether they had been mouth breathers or not. If Mr. Badcock found those children with a large mandibular angle probably they were mouth breathers. If the angle was of the proper size it was quite possible that the prominence of the upper teeth was caused by thumb-sucking or a comforter. He quite agreed with Dr. Sim Wallace that no fixed ideal of beauty was possible, but there should be certain lines outside which there was disharmony and inside which there was harmony. He did not think it mattered much whether a man or woman had a classical Greek profile or something more Gallic, irregular and charming, so long as the face was harmonious within the lines. He noticed that in Dr. Sim Wallace's sketches he carefully avoided introducing the mandibular angle. Dr. Wallace also mentioned mastication, and he quite agreed that mastication was to a certain extent a cause, and also malnutrition, which probably had some connection with the thyroid secretion. It seemed in some way that the thyroid had the property of fixing calcium in the bones and Prof. Keith was of opinion that in many of the cases of malnutrition of bone nothing else could possibly be given as the cause. He did not think Mr. Colyer's figures with regard to breast-fed and bottle-fed children or adenoid and non-adenoid children were at all convincing. He did not care whether a child had adenoids or not as long as it was not a mouth-breather. He had seen many children operated upon for adenoids, but they had not been mouth-breathers ;

they had had sufficient space still to breathe through their noses and as long as they were not mouth-breathers he did not think the question of adenoids was a very important one from an orthodontic standpoint. Mr. Mellersh had mentioned a very interesting thing new to the Society, that some of the cases of compression might be caused by difficult parturition. It was a very remarkable thing that facial irregularity might take place at an extremely early age in the child's life. He had read a short time ago a Communication to the Odontological Section, in which Dr. Liebreich, a French surgeon, seemed to show pretty conclusively that facial asymmetry was very often caused by the ante-natal position of the child. An interesting comparison had been drawn by Mr. Chapman between the classification in the paper and that of Dr. Angle. It had to be borne in mind that the *plus* and *minus* and *zero* in the paper all related to a fixed measurement and that fixed measurement the profile angle. Whether it was worth while considering and carrying out or not it was not for him to say, but it would be very interesting if any other members of the Society could bring forward any statistics which would confirm or refute what he had said.

In conclusion he thanked them for their criticism and their generous discussion of his paper.

The PRESIDENT then announced the result of the ballot as follows :— Officers : *President*, Mr. Harry Baldwin ; *Immediate Past President*, Mr. William Rushton ; *Vice-Presidents*, Mr. Montagu F. Hopson, Mr. W. Francis Mellersh and Mr. Norman G. Bennett ; *Secretary*, Mr. Harold Chapman ; *Treasurer*, Mr. H. C. Highton ; *Curator*, Mr. Wilton Thew ; *Editor*, Mr. Carl Schelling ; *Librarian*, Mr. J. W. Doherty ; *Auditors*, Mr. W. Francis Mellersh and Mr. J. E. Spiller. Councillors : Mr. J. Lewin Payne, Mr. J. E. Spiller and Mr. Hedley C. Visick.

## Valedictory Address.

In delivering a few short valedictory remarks, the PRESIDENT said he had looked forward to a very pleasant year of office and had not been disappointed. The papers and discussions had been good, the demonstrations had been excellent, and the Treasurer had stated that the finances were in good condition. He thought the Society had to congratulate itself on quite a satisfactory year's work. That was due largely to the splendid officers the Society had, and in that connection he was sorry they were going to lose Mr. Mellersh as Treasurer. The greatest share of the work had fallen upon the Secretary, Mr. Harold Chapman, and to him he had to express his own personal thanks as well as the thanks of the members. The pang of parting was somewhat relieved by the knowledge that his old friend Mr. Harry Baldwin was going to succeed him.

Mr. RUSHTON then vacated the chair which was taken by Mr. HARRY BALDWIN, who briefly thanked the members for his election. He said he would do his best in the position in which he had been placed and he would confidently look forward to the active co-operation of all the members.

On the motion of Mr. BADCOCK, seconded by Mr. NORTHCROFT, a vote of thanks was accorded with acclamation to Mr. Rushton and to the Officers of the Society.

Mr. RUSHTON, Mr. MELLERSH and Mr. CHAPMAN having briefly replied, the Society adjourned.

# List of Members of the British Society for the Study of Orthodontics.

| | |
|---|---|
| Aubrey, H. P. | 40, Curzon Street, Mayfair, W. |
| Austen, L. G. | Cambridge House, Portsmouth. |
| Badcock, J. H. | 140, Harley Street, W. |
| Baldwin, H. | 37, Cavendish Square, W. |
| Barrett, Russell | 41, Harley Street, W. |
| Bascombe, E. D. | Melford Lodge, Bourne Avenue, Bournemouth. |
| Bennett, F. J. | 17, George Street, Hanover Square, W. |
| Bennett, Norman G. | 50, Brook Street, W. |
| Betts, E. G. | 37, Cavendish Square, W. |
| Blaaberg, C. J. | 27, Tavistock Square, W.C. |
| Bowes, J.A. | 28, South Side, Clapham Common, S.W. |
| Briault, E. H. L. | 145, Finchley Road, N.W. |
| Campion, G. | 264, Oxford Road, Manchester. |
| Campkin, H. T. | 71, Harley Street, W. |
| Chapman, H. | 20, Queen Anne Street, W. |
| Chapman, Ralph | 76, Grosvenor Street, W. |
| Clarence, T. H. | 24, Upper Wimpole Street, W. |
| Clogg, A. H. | 18, Central Hill, Upper Norwood, S.E. |
| Cribb, H. E. | 22, Upper Wimpole Street, W. |
| Denham, N. | 29, Albemarle Road, Beckenham. |
| Densham, Ashley | 18, Stratford Place, W. |
| Doherty, J. W. | 101, Worple Road, Wimbledon. |
| Edey, G. Russell | Jasmine Cottage, Chislehurst. |
| Farmer, F. M. | St. Winifred's, Hampton, Middlesex. |
| Fernie, J. G. | 10, North Common Road, Ealing, W. |
| Field, G. | 117, Park Street, W. |
| Friel, Sheldon | 71, Lower Baggot Street, Dublin. |
| Goldie, G. J. | 95, Merrion Square, Dublin, Ireland. |
| Green, W. | 10, North Common Road, Ealing, W. |
| Heath, Robert H. | 2, Park Crescent, Portland Place, W. |
| Henry, P. F. | 79, King William Street, E.C. |
| Highton, H. C. | 17, Upper Wimpole Street, W. |
| Hopson, M. F. | 64, Harley Street, W. |
| James, W. W. | 2, Park Crescent, Portland Place, W. |
| Jeffery, Louis | 1, Newton Villas, Finsbury Park, N. |
| Knaggs, S. A. | 21, Rosslyn Hill, Hampstead, N.W. |
| Knowles, C. H. | 18, Worsley Road, Hampstead, N.W. |
| Lacey, A. G. | Stedham House, Surbiton. |
| Lockett, A. C. | 121, Harley Street, W. |
| McBride, John | 26, Duke's Avenue, Muswell Hill, N. |
| McKechnie, J. N. | 29, Queen Anne Street, W. |
| Mahony, H. Alvin | 43, Manningham Lane, Bradford. |
| Malleson, H. C. | "Hampton," West-End Avenue, Pinner, Middlesex. |
| Marsh, H. E. | 1, Cantelupe Road, Bexhill. |
| Mason, E. N. | Sandown, 306, Broadway, Bexley Heath. |
| Matheson, Leonard | 22, Wimpole Street, W. |
| Mathews, E. F. Cale | 60, Newhall Street, Birmingham. |
| Maurice, A. | 76, Wimpole Street, W. |
| May, W. J. | 24, Upper Wimpole Street, W. |
| Mellersh, W. Francis | 28, Wimpole Street, W. |
| Morgan, Reginald C. | 35, Leweston Place, Stamford Hill. |
| Morris, C. S. | 47, Upper Brook Street, Grosvenor Square, W. |
| Northcroft, G. | 115, Harley Street, W. |
| Parfitt, J. B. | 179, King's Road, Reading. |
| Pavitt, P. G. | 42, Welbeck Street, W. |
| Payne, J. L. | 18, Portland Place, W. |
| Pearce, F. J. | 37, Queen Anne Street, W. |
| Philpots, M. | 14, High Street, Windsor. |
| Pidgeon, W. H. | 151, Finchley Road, N.W. |
| Pollitt, G. P. | 50, Brook Street, W. |
| Porteous, H. T. | 15, Cavendish Place, W. |
| Preedy, E. J. | 1, Hanover Square, W. |
| Rilot, Chas. F. | 22, Wimpole Street, W. |
| Rowlett, A. E. | 67, London Road, Leicester. |
| Rushton, W. | 32, Harley Street, W. |
| Samuel, B. Barnett | 11, Welbeck Street, W. |
| Schelling, C. | 37, Cavendish Square, W. |
| Scobie, J. | 145, Finchley Road, N.W. |
| Scott, P. | 1, The Mall, Wanstead, E. |
| Shattock, C. R. | Saville House, Sutton Court, Chiswick, W. |
| Spiller, J. E. | 62, Worple Road, Wimbledon, S.W. |
| Spokes, P. S. | 4, Portland Place, W. |
| Stevens, G. Maxwell | 76, Grosvenor Square, W. |
| Sturridge, E. | 29A, Wimpole Street, W. |
| Tebbitt, E. R. | 4, Frant Road, Tunbridge Wells. |
| Thew, W. | 140, Harley Street, W. |
| Thomson, G. | 38, Harley Street, W. |
| Turner, J. G. | 59, Wimpole Street, W. |
| Turner, V. E. | Prince of Wales Road, Norwich. |
| Visick, Hedley C. | 39, Brook Street, W. |
| Wallace, Dr. J. Sim | 150, Harley Street, W. |
| Watson, A. MacDonald | 3, Redcliffe Parade West, Bristol. |
| Wellings, A. W. | 35, Newhall Street, Birmingham. |
| Wood, Bryan J. | 14, Silver Street, Kettering. |

CORRESPONDING MEMBER.

| | |
|---|---|
| Layton, G. | 12, Rue Belliard, Brussels, Belgium. |